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NEW YORK, SATURDAY, FEBRUARY 22, 1919

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Shifting the Burden

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MORE THAN 250 YEARS OLD

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ECONOMY	OPERATING COST LESS THAN INSTANTANEOUS WATER HEATERS
SAVING	SEPARATE GAS METER AND SEPARATE SERVICE ARE NOT REQUIRED
MAINTENANCE	NO MORE THAN THAT OF A TANK HEATER
YOUR SMALL MAIN PROBLEM	PEAK LOAD ONLY 50 FEET OF GAS PER HOUR
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New Brunswick, New Jersey

AMERICAN
GAS ENGINEERING JOURNAL
FORMERLY THE AMERICAN GAS LIGHT JOURNAL

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Needed! A New Viewpoint on Publicity

Industries in the New Era Must Think Nationally — Wherein the Good Works of One Company May Enhance the Goodwill of a Company Thousands of Miles Distant

By EDWIN DEAN

There is no reason whatever why a home or a public building lighted by gas should be deemed less modernly equipped than one lighted in electricity.

Yet to come down to small cases, try to sell a home equipped throughout with gas lighting exclusively. Immediately you will see your prospective purchaser start adding the probable cost of equipping with electric lighting to the selling price you have set.

You know that he has classed your dwelling mentally as one of the "older houses." He is after a modern home. He is trying to ascertain if the price of your house plus the *cost of modernizing it* approaches the figure for which he could buy a home already modernized.

The Answer Lies Not in Relative Merits

Why is this? Is gas lighting an antiquated lighting, on a plane a little higher than the kerosene lamp as compared with the electric light? Did gas lighting developments reach their crest in 1886, then cease?

For answer we have reports of gas lighting displacing electric lights in city department stores where the showy, up-to-date, effects have a real dollars and cents value. We have reports of it displacing electric lights on at least two notable show place seaside resort boardwalks. We hear of it displacing electric lights in fashionable churches, in theatres, in Government buildings, and what not.

There is evidence enough that gas illumination is not lacking in merit or in modernity as compared to electric lighting. Evidence, too, that this assumption is not based on the blind, unreasoning vanity of gas men, but on the judgment of experts who have no interest whatever in the welfare of the gas industry or the prestige of gas lighting, but look at the matter of illuminating agency to be selected solely from the viewpoint of their own best interests and seldom with consideration of relative costs.

Beaten Out by a Fad

In an official Government bulletin, the author styles electric lighting largely a fad. So it is—a fad largely stimulated by adequate publicity. And a fad, by the way, that represents a tangible value, since a dwelling house equipped with it, perhaps at a lesser initial investment, commands a higher selling price than the same house equipped exclusively with gas lighting.

"But," our manufacturer of gas lighting equipment will object, "contemplate the expense we go to to advertise gas lighting. It may be that it does not have the publicity that it should have, but no one can contend that we are dodging our share of the burden."

In this he speaks truthfully. He is not only bearing his share, but a disproportionate share. The manufacturer of gas lighting equipment has a large stake in the continuance of gas as an illuminating agency. It is simple good business for him to expend large sums to protect his investment, but his interest is but puny as compared to the aggregate interests of all the companies that constitute the American Gas Industry.

Where Its Decline in Volume Hits Us Elsewhere

Take away the lighting argument for piping the house for gas—even that contemptible argument of having this if only as an insurance against interruptions to electric service—and you make it immeasurably more difficult to sell portable heaters, upstairs rooms, dining room and laundry conveniences. The loss of lighting consumption in itself will in the future represent, perhaps, the least loss in gas output that may come from a marked falling back in gas lighting prestige.

Where the Fault Lies

Our publicity efforts have been local rather than national. We spend large sums plastering our individual territory with gas propagandas and lean back satisfied that we have made our town safe for gas for a decade to come.

Our efforts have been, doubtless, unconsciously, narrowly selfish. We have thought nothing of the other fellow's interests, but only of our own.

Had we spent a fair proportion of the sums we spent locally through some central—a national—agency to boost gas generally and abstractly, there is little

doubt that in our own particular locality we would be to-day more impregnable than even the strongest of us are.

Is Not Bound by the Limitations of Paid For Space

National publicity for gas does not mean alone advertising in paid for space. This, of course, must be part of the effort, but there are other effective means of enhancing the prestige of gas and the gas industry as well.

I remember an incident that occurred in the editorial offices of one of our gas journals. Its editor had published an account of how the biggest gas company had in a remarkable manner met a stupendously exceptional responsibility with the result that a calamity that well might have been terribly tragic was averted.

"Place on my desk all clippings of outside towns newspaper comment," I overheard him instructing the News Editor.

I expressed puzzlement as to why he was not interested in local comment.

"In getting that article," he explained, "I was not so much concerned about the interests of the local company. They had the facts. If they do not have sense enough to capitalize them, they're beyond my help. I was interested principally in giving other companies a story they could exploit to enhance their local good will."

There you have it: Every good work that is wrought by one company is an asset to all companies, even though they be situated a thousand miles distant. By enhancing the public's confidence in the honesty of the policies of this one gas company, the public's confidence in the honesty of the policies of all gas companies is enhanced.

Quite a number of incidences came to notice of newspapers throughout the country abstracting portions of this article for republication as news.

But what if there had existed then a central—a National—gas publicity bureau? There was much of the dramatic in this gas journal article, much of the colorful; just the kind of stuff the daily newspaper likes to serve out to its readers.

The Clip Sheet Service

Such a central publicity gas bureau would have had on its staff a man who would be familiar with what constitutes good newspaper copy, the kind of reading that newspaper editors hunger for. He could have prepared from the facts presented in this article, a story that would have been suitable and desirable almost without editing, for any newspaper in the country.

That this article contained a good newspaper "story" is attested by the fact that a number of newspapers went to the effort of studying it to find in its several columns enough to make a fraction of a column for their own publication. What if this fraction of a column story, stripped of all technical details and including only the human interest, the dramatic and the colorful, had come to the desk of the editor of every worth-while newspaper in the country, practically ready, save for a few scratches of the blue pencil, to be shot down to the composing room? Hundreds of them would have printed it and would have rejoiced exceedingly at the opportunity.

Such service is known as "Clip Sheet" service. For the American gas industry as a whole to establish such a service would cost relatively little. Its return would be represented by thousands of columns of gas publicity that money could not buy.

There are countless incidents that arise in the conduct of gas companies throughout the land that lend themselves to newspaper stories. A central publicity bureau could collect and see that they came to the newspapers' attention in such form that to convert them to the newspaper column represents a minimum of effort.

Accuse the average gas man of being an altruist and he will think you are attempting to be humorous. Yet as a matter of fact many of their deeds approach so closely to the point of altruism that the line of demarcation is very faint indeed.

Remember in the gas journals stories of gas companies, in time of emergency, selling coke to poor people while back in the offices the higher executives were wrinkling their brows over where they were to get coke three months hence to make their gas, recollect the gas company that turned over a high-salaried officer without remuneration to assist the establishment of a food service that possibly averted hunger to thousands of the impoverished in the city it serves, consider the gas companies in large number, while regular munition manufacturers were paying excess profits taxes in vast sums, making the prime explosive used in the war in colossal quantities without one cent of profit. These are but isolated instances. By searching the columns of gas journals enough additional could be found to run the sentence on indefinitely.

Wouldn't it be immeasurably to the advantage of each and every gas company in these United States if the newspapers of the country were as consistent in publishing such facts as are the gas journals? Wouldn't such publicity have tended to engender at least an appreciation of if not actually a sense of gratitude, of affection, towards the gas companies in general?

A "clip sheet" service conducted by central and national gas publicity bureau would have gone far towards making such the case.

But I am drifting off into details. Why fit out the staterooms before the ship is built.

Primarily the question is—have our publicity efforts in the past lacked effectiveness through lack of concentration.

Not a Question of Spending More Money But of Getting Better Returns

It is not a question of spending more money for publicity purposes than we have been spending, but of spending it more effectively. Wouldn't it pay to spend a little less on those "ticklers" in the local press, and the amount thus saved on the maintenance of a central publicity bureau?

This being conceded, we must readjust our viewpoint on publicity. We must not let it worry us should we discover that the sums we are spending on advertising benefit our neighbor as well as they benefit ourselves.

If it be found that we ourselves have been benefited, then, indeed, we have gotten a return on our investment. What matters it, then, if so-and-so a

few miles away without contributing a cent for such purpose, has also sold a few ranges, a few more lamps and has "gotten in soft with his public" simply because *we* have advertised.

It is galling, I admit, to think of the hang-back type reaping a portion of what we sow. But we must conquer a whole lot of perfectly human prejudices to succeed. Particularly we must not permit this prejudice to handicap us while the wolves are howling right outside the door.

Electric lighting has merit, in many situations predominating merit; likewise even electric heating and other electric services. But this does not imply that we should let gas without real reason be relegated to a back seat.

It can compete on terms of equality for lighting, in general terms of superiority for space heating, for cooking and for industrial work. Simply because we know this does not necessitate that it so will be generally esteemed.

Effective publicity will bridge the gap. And results proved that in the past our publicity has not been effective.

Had it been we would not have been to a considerable extent in one important field routed by a fad, have come to that plane of prestige where, when an individual reaches a certain point of financial attainment, he leaves us behind as an agency good enough for the less fortunate, but not good enough for him.

Operation and Chemical Control of Water Gas Sets in Small Plants

H. Vittinghoff Offers Pertinent Suggestions of Really Dollars and Cents Value to the Operator of the Small Plant—Leaks that Are Existent and How They May Be Eliminated

In considering the processes of manufacturing gas in a small plant we have to meet the problem in a manner entirely different from that which would be followed in a large plant, H. Vittinghoff made clear in his paper on this subject presented at the annual meeting of the New England Association of Gas Engineers. Instead of having available a considerable and well-articulated works organization, it must be remembered that it is of the utmost importance that the number of men employed should be kept at a minimum, as the labor cost in a small plant represents a very much larger proportion of the total manufacturing cost than in a large plant.

It also happens very frequently that these small gas plants are operated as minor adjuncts in connection with more important electric or street railway activities. In such cases the superintendent in charge of the gas plant very often is a man trained either as an electric or street railway operator who knows comparatively little of the details of the operations which enter into gas manufacture.

In this article, while no attempt will be made to set forth in detail all the manifold technical observations which must be carried on continuously in a large plant in order to maintain the processes at the highest efficiency; on the other hand, the subject will be covered with sufficient detail to outline fully the chemical reactions which underlie the gas-manufacturing process in a water-gas plant, large or small. It will be assumed that those for whose guidance the general principles of chemical control of water-gas manufacture are here outlined are thoroughly familiar with the mechanical operation of a water-gas machine, with the precautions which must be taken to insure its safe operation, with the maintenance of the checkerwork, with the daily routine of cleaning fires, and, moreover, have some familiarity with the manipulation of the ordinary gas-testing apparatus used for such elementary analyses as are here described.

Regularity of Operation a Prime Requisite of Economical Operation

One of the most important things to remember is that regularity of operation is a prime requisite for economical operation. This regularity should be observed first of all in connection with cleaning the set, which should be done once during every twelve hours of operation. In fact, it has been found in larger plants, where the yard force is always available to be drawn on for the cleaning operation, that materially better results can be obtained in the economical consumption of coal and oil when cleanings can be made as often as once every eight hours. However, this would probably not be advantageous in a small plant, where the labor cost represents such a large proportion of the total manufacturing cost.

Regularity must also be observed in charging the generator. To start with a generator filled with incandescent fuel and run it until it is about half empty, and then fill it up again with cold coke or coal, is very bad practice. The longest interval between charging should probably not exceed an hour or embrace a maximum of more than eight runs.

Further, regularity should be observed in starting the blow and the run and in the oil introduction. It is not conducive to good results to have the gas maker rely upon an ordinary alarm clock to indicate to him the length of the cycle, but he should be furnished with a first-rate gas-maker's clock having a conspicuous second hand; and it should be impressed upon him that it is not the hour and the minute hands which are of primary importance to him, but that he must run his machine by the second hand. Once the length of a blow and run has been decided upon, the gas maker must adhere to the schedule. This is a rule to which there is one exception.

Best Method of Obtaining Temperature and Maintaining It

The temperature of the carbureter and superheater is, of course, of vital importance for the gasification of the oil. While the carbureter has the important function of volatilizing the oil, the superheater, which performs the final work of converting the vapor into a permanent gas, is the apparatus most closely to be watched. For this purpose pyrometer thermo-couples should be introduced into the checker brick a few courses from the bottom and two or three courses from the top. Just what the temperature of this checker brick should be, as indicated by the thermo-couples so placed, it is impossible to state definitely. This depends not only upon the individual machine, the exact location of the sensitive ends of the thermo-couple, but above all upon the quality of oil to be carbonized. With the oil which most of

our companies have used it has been found that between 1340 and 1380 at the bottom of the superheater and around 1340 at the top results in satisfactory operation.

The question now arises as to the best method of obtaining this temperature and, having it, of maintaining it. The heat necessary to raise the checker brick to the requisite point is, of course, to be obtained only by the consumption of fuel in the generator. There are two ways in which the rate of flow of heat from the generator into the carbureter can be controlled—either by varying the volume of the blast or else by varying the period of the blast while the volume is maintained constant. Because of certain operating difficulties encountered when the first method is followed, the latter expedient is usually adopted. It must be remembered, therefore, in considering all that has been said about maintaining a constant cycle of operations, that this applies only in so far as a constant temperature indicated by the superheater thermo-couples is being maintained. When material variations are noted, the length of the blow should be increased or decreased, bearing in mind, however, at all times that decreasing the period of blow below a certain point and during a number of consecutive cycles will inevitably result in a low temperature of the fuel in the generator, with all its attendant ills. Consequently, care must be taken that at all times the generator is to be kept sufficiently hot, even if it becomes necesary to keep the carbureter and superheater temperature within limits by wasting some of the carbon-monoxide formed in the generator. With a well-balanced set, however, this should rarely, if ever, be necessary.

Delaying Introduction of Oil

One point should be remembered in connection with the injection of the oil into the carbureter. It almost invariably happens that several of the upper layers of the checker brick in the carbureter become excessively hot during the blasting period, with the result that when oil is first introduced this is immediately volatilized and the vapor broken down into elemental forms—carbon and hydrogen. In order to avoid this, it is always advisable to wait with the introduction of oil for half a minute after steam has been introduced into the generator in order that the blue gas first formed may have an opportunity to absorb some of this excessive heat.

The next thing of importance to consider in the operation of a water-gas set is the amount of air, steam and oil used. It is difficult to say with any degree of definiteness just how much air or steam is to be introduced per thousand feet of gas made. This is a matter which varies materially with the kind of fuel used, the length of the cycle and several other factors, and ought to be determined for each individual set operating under normal conditionss. However, some general instructions can be given which should lead to the result of finding somewhat more quickly the most economical rate of flow.

By experience it has been shown that between 1,500 and 1,700 cu. ft. of generator air (not total air) per thousand feet of gas made will result in a hot fire, a carbureter and superheater of proper temperature for the distillation and carbonization of the oil, and such an amount may also be expected to carry with it fuel consumption at an economical rate.

Similarly, it has been found by experiment that 35 to 38 pounds of steam per thousand feet of gas made results in a "blue" or uncarbureted water gas free from an excessive amount of harmful carbon-dioxide, and such a rate at the same time will usually load the set-up to its most economical rate of make.

Equipping with Some Device for Measurement of Air and Steam

It is, of course, presupposed that the water-gas set is equipped with air and steam meters. If it is not, some measuring devices should be improvised. It is not absolutely essential that these devices should read in the absolute units indicated above, but it is imperative to have some form of meter for air and steam which will enable the operator to observe the relative rate of flow of these fluids into the machine, to measure the variation when he wants to increase or decrease the flow, and, above all, to reproduce at will conditions which experience has taught result in a high operating economy.

It must be borne in mind, however, that the figures given above are only of general application, and special conditions will vary them. The only certain way of insuring economical operation of a water-gas set is by means of chemical control. No large plant can operate efficiently without being constantly under the supervision of a highly trained engineer who has at his service a chemist capable of making all the various tests and analyses of the raw materials used, the intermediate products obtained and the final resultant gas and by-products. In a small plant, however, the employment of a superintendent and a chemist who devote all their time to supervising the manufacturing processes is not feasible, yet to leave the operation of the plant entirely to men not technically trained and to rely entirely upon guesswork will only result in the most wasteful method of operation.

Under such circumstances it is therefore necessary for whoever has charge of the operation of a gas department to acquaint himself with the methods of carrying out some of the fundamental chemical analyses absolutely indispensable for arriving at economical methods of operation under conditions existing and with materials available at the plant under consideration. Fortunately, only the simplest gas analysis apparatus of the Orsat type, familiar to most men who have ever worked around boiler plants, is necessary.

Varying Operation to Suit Quality of Material

A small plant is usually not in the position to buy and store large quantities of raw material, for often, at least in the gas business, it is impossible to buy the materials under standard specifications, so that testing of them is very largely only a matter of academic interest. Since shipments usually vary in quality rapidly, and because large storage yards or tanks are not available for averaging such shipments, it is important that the method of operation maintain a certain mobility which will at all times enable the superintendent to vary his operation to suit the quality of the material delivered. It is for this reason that tests of the finished gases as well as the intermediary blue water gas, producer gas and waste gas should

(*Continued on page* 172.)

36,473,871 Tons of Bituminous Coal, 1,486,305 Tons of Anthracite and 822,212,138 Gallons of Oil Used to Produce Gas Manufactured in U. S. in 1917

From This 577,163,790,000 Cu. Ft. of Gas Was Made — Growth of More Than 25 Per Cent in Output Over 1915 Last Year of Record — By-Product Ovens Supply Bulk of Volume, but Sell Less Than Half of Production

The sales of artificial gas in the United States in 1917 amounted to 342,151,129,000 cu. ft., an increase over 1915, the next previous year for which comparable figures are available, of 29 per cent, according to a report compiled by C. E. Lesher, of the United States Geological Survey.

The sales of water gas in 1917 amounted to 153,457,318,000 cu. ft., an increase of 24 per cent over those in 1915, and represented 45 per cent of the total artificial gas used.

The sales of gas from by-product coke ovens, 131,026,575,000 cu. ft., increased 20 per cent over 1916 and 55 per cent over 1915. The gas sold from coal-gas plants (bench retorts) decreased from 43,747,432,000 cu. ft. in 1915 to 42,927,728,000 cu. ft. in 1917. The sales of oil gas increased from 13,971,333,000 cu. ft. in 1915 to 14,739,508,000 cu. ft. in 1917, a gain of 6 per cent.

What It Took to Produce It

The total coal gas produced in 1917—sold as well as lost or used by producers—amounted to 47,525,148,000 cu. ft., the manufacture of which consumed 4,960,297 net tons of bituminous coal, 106,627 gal. of oil and 1,296 net tons of cannel coal, the oil and cannel coal being used as enrichers.

The total water gas produced—174,357,536,000 cu. ft.—required the use of 1,486,305 gross tons of anthracite, 7,815 net tons of bituminous coal, 1,448,173 net tons of coke (most of it produced by the same operators in coal-gas retorts) and 684,620,637 gal. of gas oil.

The total oil gas produced—17,552,855,000 cu. ft.—required the use of 137,484,874 gal. of oil.

The quantity of bituminous coal charged into by-product coke ovens was 31,505,759 net tons, which produced 337,728,251,000 cu. ft. of gas.

Sales of By-products

The sales of coke from coal-gas plants in 1917 amounted to 1,857,248 net tons, valued at $10,953,693, an increase of 12 per cent in quantity and of 52 per cent in value over 1915. The sales of by-product coke in 1917 showed an increase over 1915 of 59 per cent in quantity and of 186 per cent in value. The total quantity of the two kinds of coke marketed in 1917 amounted to 24,296,528 net tons, valued at $149,596,846, a net increase of 54 per cent in quantity and 168 per cent in value over 1915. Higher average values per ton were obtained for both kinds of coke.

The sales of tar from plants manufacturing coal gas, water gas and oil gas, and from by-product coke ovens, amounted to 335,578,441 gal., valued at $8,631,993, in 1917, an increase over 1915 of 41 per cent in quantity and of 38 per cent in value. Oil-gas tar shows the greatest proportionate increase in quantity and coal-gas tar the only increase in average value.

The ammonia produced, reported in terms of liquor, sulphate and anhydrous ammonia, has been computed as its equivalent in sulphate for convenience in comparison. Coal-gas retorts and by-product coke ovens produced approximately 652,333,000 pounds of sulphate, valued at $19,265,989, in 1917, an increase of 154,234,877 pounds, or 31 per cent, in quantity, and of $8,068,863, or 72 per cent, in value over 1915. Coal-gas ammonia showed a decrease in quantity and a small increase in value, whereas by-product coke-oven ammonia showed an increase in both quantity and value during the same two years.

Greatly Increased Sales of Light Oils

The greatly increased sales of light oils show the extent to which this industry was stimulated by the war-time demand for the raw materials required for high explosives. Crude light oil, secondary light oil, benzol, toluol and solvent naphtha aggregated 61,823,756 gal., valued at $30,833,298, an increase of 245 per cent in quantity and 315 per cent in value over 1915. In 1917 the quantity of light oil obtained from coal-gas retorts was 770,298 gal., compared with 526,651 gal. in 1915, a gain of 46 per cent.

The value of the product increased tenfold.

The quantity of light oil produced at water-gas plants in 1917 was 6,420,717 gal., a gain compared with the 788,876 gal. produced in 1915 of 5,631,841 gal., or 714 per cent.

The value of the product increased twentyfold.

No light oil was recovered in the manufacture of oil gas in 1915; the total amount so produced in 1917 was 205,475 gal. Oils produced at by-product coke ovens increased from 16,600,857 gal. in 1915 to 43,714,429 gal. in 1916, and to 54,427,266 gal. in 1917, the percentages of increase being, respectively, 163 and 25 per cent.

Crude naphthalene shows a remarkable increase—from 688,790 pounds, valued at $50,524, in 1915, to 17,675,941 pounds, valued at $579,136, in 1917. The largest increase was in the output of naphthalene from by-product ovens, which increased from 465,865 pounds in 1915 to 8,820,405 pounds in 1916, and

ARTIFICIAL GAS AND BY-PRODUCTS MARKETED IN 1915, 1916 AND 1917*

Product	1915 Quantity Sold	1915 Value of Sales	1916 Quantity Sold	1916 Value of Sales	1917 Quantity Sold	1917 Value of Sales
Gas (1,000 cu. ft.):						
Coal gas	43,747,432	$40,257,108	.....	.....	42,927,728	.....
Water gas	124,129,569	112,281,956	.....	.....	153,457,318	.....
Oil gas	13,971,333	12,668,169	.....	.....	14,739,508	.....
By-product gas	84,355,914	8,624,899	110,061,607	$10,779,208	131,026,575	.....
	266,204,248	$173,832,132	.....	.....	342,151,129	.....
Coke (net tons):						
Coal gas	1,662,552	$7,198,377	.....	.....	1,857,248	$10,953,693
By-product	14,072,895	48,558,325	19,069,361	$75,373,070	22,439,280	138,643,153
	15,735,447	$55,756,702	.....	.....	24,296,528	$149,596,846
Tar (gallons):						
Coal gas	47,863,192	$1,555,363	.....	.....	53,318,413	$1,774,326
Water gas	51,381,911	1,118,656	.....	.....	59,533,208	1,258,683
Oil gas	64,433	4,268	.....	.....	727,556	32,682
By-product	138,414,601	3,568,384	185,506,024	$4,865,921	221,999,264	5,566,302
	237,724,137	$6,246,671	.....	.....	335,578,441	$8,631,993
Ammonia sulphate or equivalent (pounds):						
Coal gas	103,842,035	$1,329,651	.....	.....	91,540,590	$1,362,125
By-product	394,256,000	9,867,475	470,530,547	$14,152,243	560,792,322	17,903,864
	498,098,035	$11,197,126	.....	.....	652,332,912	$19,265,989
Light oils (gallons):†						
Coal gas	526,651	$39,004	.....	.....	770,298	$448,855
Water gas	788,876	59,840	.....	.....	6,420,717	1,655,204
Oil gas	.....	.....	.....	.....	205,475	74,035
By-product	16,600,857	7,337,371	43,714,429	$30,003,360	54,427,266	28,655,204
	17,916,384	$7,436,215	.....	.....	61,823,756	$30,833,298
Crude naphthalene (pounds):						
Coal gas	222,925	$3,565	.....	.....	383,349	$9,584
Water gas	.....	.....	.....	.....	16,548	103
By-product	465,865	46,959	8,820,405	$289,688	17,276,044	569,449
	688,790	$50,524	.....	.....	17,675,941	$579,136
Retort carbon (net tons):						
Coal gas	120	$1,362	.....	.....	252	$2,733
Water gas	741	8,511	.....	.....	1,068	12,067
Oil gas	19,500	167,700	.....	.....	21,991	204,536
	20,361	$177,573	.....	.....	23,311	$219,336

*Other products not included in this table, valued at $396,007 in 1915, $1,841,175 in 1916 and $1,145,633 in 1917, were: From coal-gas plants, creosote, tar distillery products, pitch, coke breeze and spent oxide; from oil-gas plants, lampblack, petroleum coke, briquets and yellow prussiate of soda; from by-product coke oven plants, coke breeze, sodium ferrocyanide, residue, drip oil and spent oxide.

†Includes crude light oil, secondary light oil, benzol, toluol and solvent naphtha.

PRODUCTION OF ARTIFICIAL GAS AND FUELS CONSUMED IN ITS MANUFACTURE

Fuel	Coal Gas	Water Gas	Oil Gas	By-product Gas
Anthracite (gross tons)	.....	1,486,305	.....	.....
Bituminous (net tons)	4,960,297	7,815	.....	31,505,759
Coke (net tons)	.....	1,448,173	.....	.....
Oil (gallons)	*106,627	684,620,637	137,484,874	.....
Cannel (net tons)	*1,296	.....	.....	.....
Product (1,000 cu. ft.)	47,525,148	174,357,536	17,552,855	337,728,251

*Used as enricher.

again to 17,276,044 pounds in 1917. Water-gas plants reported in 1917, for the first time, a recovery of crude naphthalene, the product amounting to 16,548 pounds.

The sales of retort carbon in 1917 amounted to 23,311 net tons, valued at $219,336, the greater part of which was produced in oil-gas retorts. By far the largest proportion of the retort carbon produced is burned by the operators themselves and is therefore not reported here.

Statistics showing the production and sales of artificial gas and by-products and the fuels used in 1915, 1916 and 1917 are shown in the accompanying tables.

Value of an Understudy

Why Assistant Who Has Been in Charge of Certain Branch of the Department's Work Is Not Fitted to Take Over Department Without Hitch in Case of Executive's Absence

By RALPH ELSMAN
General Manager, Kings County Lighting Company, Brooklyn, N. Y.

When a theatrical production has to cancel a performance owing to the lack of an understudy for some part which has been suddenly left vacant, the loss incurred can be stated in exact dollars and cents. There is no guesswork nor is there any possibility of ever regaining the money.

The application of this to the public utility industry is very plain, according to my mind, and the value of an executive who is not sufficiently big to train some man to fill his job is in mind but exactly 50 per cent of what it should be.

How many times during the course of a business year, do we hear of a department being unable to function properly because the head of that department is absent either through illness or for some other legitimate reason. Thus it becomes apparent that the failure to train an understudy has cost actual money and as in the case of the theatrical production it is a loss that never can be wiped out.

No department that is dependent entirely upon a certain man's direction can run smoothly. By this I do not mean that authority should be divided, but rather that an executive or department head should train some member of his department to direct the efforts of the other employees under his control. If this is done there is a bulwark against the misfortune that is liable to overtake any organization at any time.

Does He Represent Dead Wood on the Payroll?

The objection that naturally arises that an understudy is practically dead wood on a payroll is easily met when the salary is placed against the possible loss. Thus, if a man is a minor executive or department head the salary of his understudy would be based on the possible loss should he be absent from his post for any considerable length of time. Efficient business methods require that all of these questions be debated carefully and the possible profit weighed against the possible or even probable loss.

There is another side to the question of training an understudy that perhaps is, after all, the best argument in its favor. Executives who are weighed down by a mass of detail work are only half filling their jobs. Transferring a very great part of this detail to an understudy, or perhaps we should call him an assistant, will allow the executive to devote time to new and creative ideas that will make for the advancement of his company.

The transferring of details to the assistant, as we will now call him, does not mean that the head of the department has lost contact with his employees, but on the contrary it has put his work in a new light and has given him a new perspective on what he may expect from his department in relation to other departments in a well managed concern. He is able to bring to the work a new, fresh, clear vision that is so necessary for the welfare of the entire company.

$1,500 a Year Saving From an Hour's Thought

As an example let us take the well-managed department of any company where the head has turned over to his assistant the essential details but withal has maintained his control. His judgment is not warped by too close proximity to the problem in hand, but rather is made keener because he at once can grasp all sides of any problem that may be presented to him. His thoughts are clear, and he is able to face each day's work with a desk swept free of a mass of papers and other details.

Such a condition, perhaps, seems to be only an ideal and not possible save during the business millennium but it is not only possible, but is a goal that can be obtained by constant striving. I know of one department whose head, by a clever twist in handling ordinary routine, that resulted in the elimination of lost motion and the reduction of cost, made the meek little profit of $1,500 within one year. This $1,500 is based on one hour's thought. A pretty profitable hour in my estimation.

Naturally it is not possible to find understudies on every corner, any more than it is possible to find executives in these selfsame places, but if the policy is pursued it is remarkable how rapidly can be developed within an organization, men who have the most splendid talents in aiding the management of departments.

Biggest Reason of All for the Understudy

I purposely have avoided perhaps the biggest reason of all for the executive understudy. It is that of the executive who for any one of many reasons may sever his connection with an organization. If he has been without this understudy there is bound to be chaos and the resultant loss irreparable.

Many men are under the mistaken idea that an assistant, who has been in charge of a certain branch of work for the department, adequately fulfills the need of an understudy. This is not so for he, by the very nature of his training, defeats the end sought because he is bound to consider the work that he previously had been closely associated with as being of paramount importance as against the work of the other bureaus in the department. This is a matter that requires careful attention and a great deal of thought, for while I have sketched in general the plans, they of course must be modified to suit local conditions, and their adoption must be made in such a way that there can be no friction within the department which of itself would defeat the end to be gained.

In the Service of New England Gas Companies Woman Worker Has Demonstrated that She Merits a Place in the Gas Industry

Geoge H. Priest Finds that Her Introduction Has by No Means Been so Extensive in the Northeast Section as in Other Parts of the Country, but Where She Served and Was Properly Placed She Served Well

Whether or not women workers are to retain the positions in which they substituted for men ir the war emergency is a question that, in the best interests of the gas industry, must be answered *now*. Reports have been published of successes or shortcomings in isolated instances. In a paper presented this week at the annual convention of the New England Association of Gas Engineers, George H. Priest, general manager of the Brockton (Mass.) Gas Light Company, presents the first American results over a broad territory.

The results obtained from questionnaires sent out to the leading gas companies of New England indicate that the matter of the introduction of women workers was not of great consequence to any of them and that only in a few cases did it seem worth considering at all.

The experiences of English companies, where employment of women has become a settled thing in practically all departments, might lead to the conclusion that some companies, at least, on this side of the water might be adopting the same practice. That such is not the case, so far as New England is concerned, is proved by the following statistics:

Thirty-eight questionnaires were sent out and thirty answers were received. It is assumed that the eight who did not reply did not find the matter of consequence in their own particular case. Of the thirty replies, sixteen stated that no women had taken the places of men. Out of the thirty-eight of the largest companies, therefore, twenty-four have apparently made no changes along these lines. The fourteen who have employed women to some extent have answered questions in the following manner:

Question 1.—*How many men have you replaced with women?*

Three companies have replaced one man.
One company has replaced two men.
Two companies have replaced three men.
One company has replaced four men.
Two companies have replaced five men.
Two companies have replaced six men.
Two companies have replaced seven men.
One company has replaced nine men.

It will be seen that only seven companies have replaced more than four men with women. The maximum number replaced was nine.

Question 2.—In what departments have you employed women in place of men, and what proportion of the employees in such departments have been replaced?

The companies report the replacement of men by women in the following departments:

House lighting maintenance department, two companies.
Cashier, one company.
Office, eight companies.
Purchasing department, one company.
Meter reading department, three companies.
Sales department, two companies.
Messenger, one company.
Elevator operator, one company.
Stock room, one company.

Question 3.—In what cases do you expect such employment to be permanent?

Employment is expected to be permanent as follows:

House lighting maintenance, two companies.
Office, eight companies.
Meter reading, one company.
Meter reading dependent on women, one company.
Sales, one company.
Elevator, one company.
Stock room, one company.
In no cases, two companies.

Question 4.—Have women been paid the same wages as men for the same work and same length of experience?

Women have been paid the same wages in six companies and smaller wages in six companies. In one of the latter companies the rate for women was 65 per cent of the men's rate.

Question 5.—Can women accomplish as much work in the same time as the men?

Three companies answered that women could not accomplish as much and six companies answered that they could. Other answers were as follows: "In the office, yes"; "Sometimes more"; "Yes and No"; "Once in a while."

Question 6.—Have your operating costs been affected favorably or unfavorably by the employment of women as substitutes?

One company reported that in salaries only saving had been effected; two report favorable effects in the office; one reports unfavorable effects in office and maintenance departments; two report unfavorably on meter readers, and seven report no appreciable difference.

Question 7.—In what departments have the women qualified for the new work?

Eight companies report that women have qualified for office work; two companies for sales work; two in house-lighting maintenance; two for meter reading, and one each as messenger, cashier and elevator operator.

Question 8.—Has the employment of women influenced the company's relations with the public in any way?

Nine companies report no influence on the company's relations with the public; one company reports that the employment of women has some influence—presumably favorable; three companies don't know.

Question 9.—Has it been entirely satisfactory to the men employees?

Eight companies report no trouble from the men employees and four more believe there will be no difficulty.

Question 10.—Has it involved any complication? How?

Eleven companies report no particular complications; one company reports that a new rest room is required, and one furnishes the information that women cannot work at night in cases of emergency.

Question 11.—Are there any particular departments where the work of women is especially adaptable?

Seven companies report that women are especially adaptable for office work; two companies for sales work; three for house-lighting maintenance; one each for stock records and meter reading, and one company replies that they are not especially adaptable for any department.

Question 12.—Shall you reinstate all men returning from Government service?

Sixteen companies reported that all men returning from Government service will be reinstated; a few companies added emphasis to the remark. Other replies were as follows:

1. "All for whom we have work, or who can replace less efficient employees."
2. "All but one."
3. "So far as we possibly can."
4. "We shall treat each case individually."
5. "All we would normally have kept."
6. "In as many cases as possible."
7. "As far as possible."
8. "Yes, if physically fit."

A study of the foregoing information is not particularly illuminating. It is evident that women have made good in the office in practically all cases. In several cases they have qualified in the house-lighting maintenance and sales departments. In all other cases their employment has apparently been an unimportant factor, and one would infer that, with very few exceptions, the matter will cease to be of interest to the majority of companies as soon as the war conditions cease to exert a predominating influence on operation.

The following companies have volunteered further information:

Mr. Nichols, of Quincy, believes that there is a distinctive field for women in the gas industry aside from the selling and demonstrating end. His experience has been as follows:

Women Take More Interest in Work than Men

"When we first employed women a year ago, after some preliminary training we put them out on house complaint work, such as adjusting stove burners, gas irons, mantle burners and replacing mantles, with results that were most satisfactory, their work being done more thoroughly than the men were doing it and they seemed to take more of an interest, possibly because the work was new to them, and I have had many telephone messages from customers that the women had corrected their minor defects in appliances that our men had persistently overlooked or neglected.

"It was with considerable regret that I was obliged to transfer these women to reading regular meters, owing to the loss of many men to the shipyards. They have made good in that work, although they were somewhat slower to grasp the principles of the index than men.

"I have not used them on reading and collecting prepayment meters, as I don't think they are so well adapted to it, and intend to put them back on the light jobbing work at the first opportunity."

Mr. Morrison, of Lynn, states that in his company from Jan. 1, 1918, to April 17, 1918, time off for sickness and other reasons taken by women in office work amounted to one employee for 270 days, or, roughly, 10 per cent, and stated that some authorities figured this as high as 30 per cent. The Lynn company is now allowing two weeks' vacation and two weeks off for other reasons, with a bonus for all women employees.

Brockton is employing a number of women in the house-lighting maintenance and sales departments, which are now combined. It is difficult to derive exact information because of the abnormal conditions now existing, principally from the fact that sales of merchandise are very small. The majority of people are preferring to wait, with the expectation that prices will drop. Saleswomen possess the decided advantage over men of being able to gain entrance to houses where men will not be allowed. In house-lighting complaints, defects can be remedied as readily by women as by men, but on ranges and larger gas-consuming appliances men have a decided advantage. It is the expectation in Brockton that the employment of women in the above departments will be permanent. In the accounting department it has been necessary to try out about six girls in order to find one capable one. In this department about three of the new girls will probably retain their positions. The principal weakness seems to be a tendency to talk too much and not to take as much interest in their work as the men. In the meter-reading department the women meter readers did not prove a success, due to the fact that they could not read meters in difficult locations, and it was necessary to put a man reader for about three days in each district to read the "scats," whereas when men were doing all the reading this work took only one-half a day.

In New York City the women meter readers have been employed extensively and have given general satisfaction. It has been demonstrated, however, that women under twenty-eight years do not possess the necessary qualifications. The Consolidated Gas Company in October was employing hundreds of women, not only as meter readers but as gas appliance inspectors, lamp inspectors, salesmen, bill collectors, clerks and bookkeepers.

In England the situation is entirely different. For a great many years women have been employed for light work, such as meter reading, lamp trimming, meter-shop work, setting and removing meters and appliances, etc., and since the war they have been employed in practically all departments of manufacture and distribution, even to loading tar barrels and emptying purifiers. They have been used extensively in retort-house work, in all sizes of plants where the charging has been by shovel, scoop or machine. Their employment has always met with success as soon as the men could be convinced that it was purely a war measure. The present outlook in the British Isles is uncertain, but it is probable that a great many women will continue to work in the retort houses unless a considerable number of trained stokers are immediately released from Government service.

More Easily Discouraged and Less Ambitious

The *American Magazine* of July, 1918, has an interesting article concerning women, and from it the following ideas have been gleaned: Women must have better

working conditions, more light, cleanliness, rest rooms, etc. More care is necessary in considering the moral standards of girls working together than with men. They are more easily discouraged than men and less ambitious, but quicker to learn, more conscientious and more careful in following instructions, whether the latter are right or wrong. They are more mature at the same age and acquire more dexterity in handling parts, but lack the initiative of men and do not have the faculty for understanding mechanics or any new problems on which special training has not been given.

The payroll is likely to be larger with women than with men, as their stability seems to be less. There are many more absences, both from sickness and other causes. It is hard for women to be impersonal, and they are more likely to be loyal to an individual than to a business. Women seem to prefer to work for men rather than for women. They are conservers rather than spenders or pioneers in the line of operating improvements. It is expected that they will make business cleaner and more wholesome, and fit themselves for better wives and mothers, provided they do not make business a lifework.

The gas journals have made numerous comments on the woman question within the last few months, and the following facts may prove of interest:

Baltimore has inaugurated an elaborate plan for abolishing flat flame burners and is using a large corps of women in this work. They are conducting a special training school, which is described quite completely, with illustrations, in the *Gas Age* for Oct. 1 and Oct. 15, 1918. This article is well worth reading by anyone who is interested in the employment of women for house-lighting work.

The Standard Oil Company is having much success in using women as managers of the various distributing stations. They now have fifty women so employed, and are filling vacancies with them as fast as they occur.

The Department of Labor in the State of Pennsylvania has made the following ruling in the case of a Pennsylvania gas company with regard to the testing of meters by women: "In the opinion of the board the employment of women in the testing of meters would not be proper from a moral standpoint, inasmuch as such work would lead them into out-of-the-way places."

In a Western gas company women are being employed as tracers in the drafting room.

In Brooklyn, N. Y., women have become competent as meter readers, collectors and chauffeurs of light cars; also as house-to-house canvassers and inspectors.

The Allentown Gas Company reports as follows:

"About four months ago the first woman reader was employed. Men will be continued for the present on quarter meters, as their daily collections make rather a heavy load and it is not thought wise to subject women to this sort of work. Even the clerical force has felt the influx of women into the business. Out of a force of thirty-five that were all young men at one time only four remain; the rest are women."

The editor of the AMERICAN GAS ENGINEERING JOURNAL believes that the gas industry owes the woman worker the utmost consideration. The following quotation is from the JOURNAL of Dec. 21, 1918:

"In some cases she has not lived up to expectations, and these expectations were by no means as high as the militant feminist would have thought they should be. In these cases she was merely a helpover, but even her she served and the gas industry would have fared ill without her. In other cases she exceeded expectation to such an extent that there will be real reluctance to again give men such tasks.

"To the AMERICAN GAS ENGINEERING JOURNAL there appears little need of dispensing with the woman worker at all, even if every man who left us were to come back, which by no means will be the case.

"There are many features of gas company work wherein women are infinitely more efficient workers than men. Let us use the women we have already trained in such work and find a place for the men in other tasks."

Women will undoubtedly play a larger part in the future than they have in the past in various branches of the gas industry. In this country, however, only the first step has apparently been taken, and there is very little information on which to base a forecast of conditions fifteen or twenty years ahead. Women who have replaced men will be retained or not according to local conditions, and apparently a manager who finds this question a factor in his business must depend largely upon his own judgment and the existing conditions of his locality.

A list of references is given for the benefit of any who may care to investigate the subject further.

The thanks of the writer is hereby extended to all of the men who kindly answered his questionnaire, especially to J. Arnold Norcross, H. K. Morrison, W. B. Nichols, W. A. Learned, W. F. Norton and others who have furnished special information.

AMERICAN GAS ENGINEERING JOURNAL:
Dec. 21, 1918; page 571.
Nov. 9, 1918; page 447.
Oct. 26, 1918; page 404.
Oct. 12, 1918; page 351.
Sept. 28, 1918; page 289.
Sept. 21, 1918; page 279.
Sept. 14, 1918; page 255.
Sept. 14, 1918; page 257.
Aug. 14, 1918; page 163.

Gas Age:
Dec. 2, 1918; page 499.
Nov. 1, 1918; page 397.
Oct. 15, 1918; page 333.
Oct. 15, 1918; page 359.
Oct. 1, 1918; page 291.

American Magazine of July, 1918; page 24.

British Experience.

British Gas Journal: Dec. 17, 1918; pages 610-611.

Monthly Labor Review.

Government Printing Office, Washington: Bulletin No. 223—"Employment of Women and Juveniles in Great Britain During the War"; Bulletin No. 182—"Unemployment of Women in Department and Other Retail Stores of Boston."

Ukiah Company Files Application to Raise Rates

The Ukiah (Cal.) Gas Company has applied to the Railroad Commission for authority to increase its rates, claiming that since July 3 last, when the commission granted the company an increase, the price of oil and increases in salaries and wages have so added to the expense of production, that the company is facing a deficit. When the rates were increased in July, the company was paying $1.40 a barrel for oil. Now it has to pay $2.60 a barrel, which does not include an increase of 25 per cent on the cost of hauling it.

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As the Journal Views It

Building the Load Up to the Plant's Maximum Capacity

There isn't going to be any vast enlargement of gas plant capacities during the ensuing few months. This is through no lack of possible market, but in general due to economic considerations.

It is unfortunate that rate relief was so long denied gas companies that, on the threshold of the new era, when they could enlarge radically yet not risk outgrowing the possible demand, they are so behind financially that to build now is impossible. It is unfortunate also that precedent would seem to establish that in future regulation the man who builds now may at some time, when costs are down, be forced to accept a reasonable return, not on the actual cost of his plant, but on what it would then cost to replace.

These features are particularly unfortunate from the public's viewpoint. It is thereby denied an enhancement of service that would be otherwise practical and logical.

It is an unfortunate situation nationally in that a liberal volume of gas company construction would open employment to thousands of returning soldiers, and the aid that a gas industry doubled and trebled in capacity could give American industries might well prove a determining factor in enabling Amer-

ican goods, despite labor costs, to compete successfully in the export market even on a price basis.

It is an unfortunate situation for the gas industry in that at a time when there is a demand for a volume of its product that doubled capacities would not overmeet it is unable financially to grasp the opportunity.

The gas industry, however, owes it to itself to clinch as great a quantity of this available business as can possibly be handled. It should aim at nothing less than aiming to load up the plants to as near the limit of capacity as can, with reasonable conservatism, be safely taken on.

The Woman Worker—A Constructive Contribution

Isolated instances have been cited in regard to the success of the introduction of the woman worker into this or that branch of gas company activity. It has remained to George H. Priest, general manager of the Brockton (Mass.) Gas Light Company in a paper presented before the New England Association of Gas Engineers, to supply the first attempt at a broad survey of the kind that will enable the gas industry to determine upon a general policy in regard to such workers for the future.

In so far as New England is concerned he has supplied the answer. It is regrettable that in the programs of other sectional associations so far received we find no effort to compile such data throughout the country.

We have her with us—the woman worker. Our acute need of her assistance is past or passing. If she does not fit, we have come to the time when we should dispense with her—this in justice to men now out of employment.

But should we dispense with her without reasonable knowledge of her potential value to us, we may within the next decade have reason to bitterly regret our action.

She is with us. The groundwork is ready. If she is worth having at all she is worth having in greatly increased numbers. We are prepared to-day to introduce new women workers and to train them to the point of usefulness.

If we dispense with what we have and sometime later find it advantageous to reintroduce them to our ranks, we will have to begin all over again.

In this paper which is published elsewhere in this issue, Mr. Priest quotes editorial comment that was published in these pages some two months ago. A careful study of his findings confirm our opinion then expressed.

We stick to our guns. The woman worker has a distinct place in the gas industry. But more general data on results achieved throughout the land will more definitely locate that place, and, properly assigned, she will so strengthen us that the industry will have good reason to be thankful that she was brought to its attention years previous to what might have been.

No comment on Mr. Priest's paper could be complete without particularly emphasizing the extreme pertinency of the inquiries he has embodied in the questionnaires he sent out in preparation of his study. Evidently the subject was placed in as able hands as could be found. Thanks to its acumen in this respect the New England Association of Gas Engineers has achieved a real triumph in supplying a really constructive contribution on a most timely and important subject.

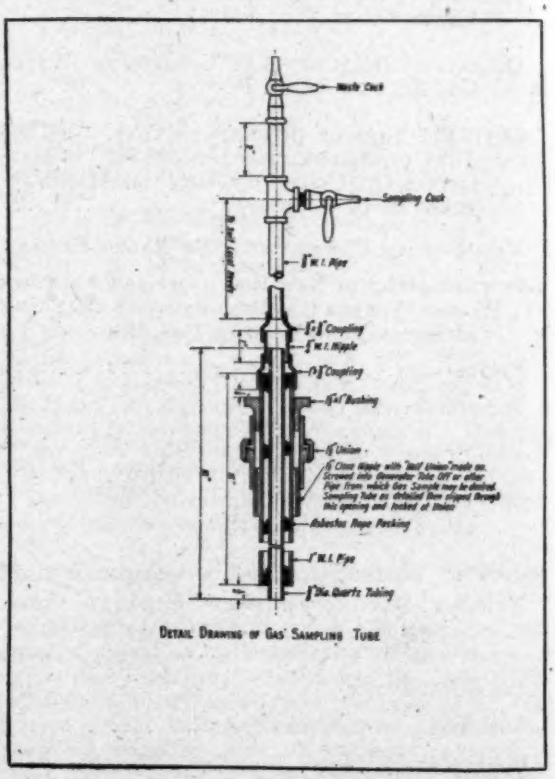
Operation and Chemical Control of Water Gas Sets in Small Plants

(*Continued from page* 164.)

be carried on at frequent intervals and should form a part of a systematic daily routine.

Every plant, large or small, should be equipped, as a matter of course, with a calorimeter to determine the heating value of the gas. Observations should be taken daily, preferably on the outlet of the holder, in order that the latter may serve as an averaging tank to yield a representative sample of the gas being sent out.

When this test is made steps should also be taken



Detail Drawing of Gas Sampling Tube

to determine the carbon-dioxide in the gas. This constituent must always be considered as an impurity and it is desirable therefore to maintain it at a minimum, although, for reasons stated farther on, it is not usually wise to try to reduce it below a certain point. In any event, it is safe to say that the upper economical limit is not in excess of 4 per cent. If this percentage is exceeded steps should be taken to discover the reason, but at this time it should be pointed out that even if the finished gas does contain carbon-dioxide not in excess of the amount specified above, that such fact does not necessarily indicate that the manufacturing process is being carried on under the most economical conditions. It frequently happens that the blue water gas as produced in the generator contains an excessive amount of carbon-dioxide which, when coming in contact with the oil injected into an overheated carbureter or superheater, will be reduced by the oil. This, of course, is a very expensive way of eliminating the impurity, and is only one of the many reasons why it is of the utmost importance that the operation of the generator making blue water gas should be carefully watched. From time to time, therefore, even if the CO_2 content in the finished gas is within the safe limit, tests should be made to find out whether or not the blue water gas is of good quality.

There are two ways of determining this. The first and simplest way is to draw from the generator samples of gas* into an aspirator bottle during five or six consecutive runs, taking care that the amount drawn in is uniformly taken during each run and is equal in amount for each run. If analysis shows that such an average sample does not contain more than 5 per cent CO_2, conditions are probably normal; but, on the other hand, if the amount shown is excessive, no definite conclusion can be drawn from an investigation so made, for it still remains to be determined what is the cause of the excessive amount of carbon-dioxide. The excess may be due to either one of two causes: too much steam relative to the heat available in the fuel bed, or improper rate of steam introduction.

The dissociation of steam into carbon-monoxide and hydrogen, which constitutes blue water gas, is dependent upon not only the time element of contact but also upon the temperature factor. Having given a fixed weight of incandescent fuel, the quality of blue gas made depends upon the amount of steam introduced per minute and upon the temperature of the body of fuel at various instances during the run.

Steam breaks down into blue water gas in accordance with the following reactions:

$$(I)\ldots\ldots H_2O + C = CO + H_2$$

or—

$$(II)\ldots\ldots 2H_2O + C = CO_2 + 2H_2$$

or—

$$(III)\ldots\ldots CO + H_2O = CO_2 + H_2$$

*Whenever samples of gas are drawn from a supply having a temperature of 500 deg. Fahr. or above, special precautions must be taken to prevent alteration of the constituents while passing through the heated sampling tube, due to reaction with the material of which it is made. A tube which has been found to be practicable in actual experience, is rugged and easily constructed, is shown in the accompanying illustration.

At first, immediately after the blowing period, the fire is in a high state of incandescence and the reaction tends to balance according to the first equation; but the dissociation of steam is a reaction consuming very large amounts of heat, which results in a cooling off of the bed of fuel, and towards the end of the run the tendency is to form gas according to the second and third equations.

Falling Back Upon the Time Contact Element

In order to prevent the reaction taking this turn, resulting in the formation of an excessive amount of carbon-dioxide, we can fall back upon the time contact element, as even at relatively low temperatures the first reaction can be obtained, providing the rate of flow of steam is sufficiently low. In other words, all that is necessary in order to make blue gas of a fairly constant quality throughout the run is to gradually reduce the rate of flow from the beginning to the end. This procedure has its limits, naturally, and a run cannot be continued indefinitely, since the temperature of the fire must always stay between certain narrow limits in order to maintain fairly uniform conditions of equilibrium during the run. For this reason it is much better to adopt a schedule of short blows and short runs rather than the usual four-minute blows and five-minute runs as practised in so many small works. The labor element must, of course, be taken into consideration, as it cannot be denied that the strain upon the gas maker when operating on a cycle of two-minute blow and three-minute run is much greater than when he is operating on a cycle of four minutes and five minutes.

A gradual reduction of the rate of flow is not feasible, but the result can be approximated by introducing steam at its highest rate during the first two minutes, stepping it down during the next minute and again reducing it for the fourth minute. Having once determined the total amount of steam which can be introduced per run, it is probably safe to say that, assuming a four-minute run, 65 per cent should be introduced in the first two minutes, 20 per cent in the third and 15 per cent in the last minute.

In order to determine whether or not the steam flow is properly regulated, it is necessary, therefore, to make analyses of samples representing various phases of the run. For this purpose three samples per run are usually sufficient, one taken during the first minute, one during the last and one fairly representing the middle of the run. While the first sample may show a very low percentage of CO_2, a marked increase can probably not be avoided; but care should be taken that this increase does not become excessive. Good practice seems to indicate that the blue water gas as made at first should contain around 3 per cent CO_2, which may increase to 4.5 per cent during the middle period and should not exceed 7 per cent during the last minute.

It is not safe to assume that the arithmetical average of these three analyses presents the true average CO_2 content of the gas made during the run, as the quantities made from minute to minute vary and are unknown. To get the true average result, therefore, composite samples taken in the manner indicated are necessary.

If analyses made in this way do not show results

approximating those indicated above, one of the first things to try in order to remedy matters is to vary the rate of injecting the steam. An excess is not only an expensive waste of boiler fuel, but also results in poor generator fuel economy and oil results. It does not by any means even follow that a large quantity of steam will result in a large make of gas per run or per hour. The contrary is often quite true. On the other hand, an excessively low rate of steam, while usually producing a good gas, brings with it certain evils. First of all, the capacity of the set is materially reduced, thereby requiring larger expenditures for labor to produce a given amount of gas per day; but, furthermore, the shortage of steam will very often bring with it serious clinker troubles requiring further expenses for the labor of cleaning, also causing heavy wear on the linings of the machine.

Determining the Proper Rate of Flow

To determine the proper rate of flow is always a matter of experiment. Assuming that a works is operating under a schedule which is not giving the most satisfactory results, it is first necessary to determine the average make per run and to find out whether or not the steam introduced figures out to about 35 to 38 pounds per thousand feet of gas made. In nine cases out of ten it will probably be found that the machine is being flooded with steam. A new quantity per run, figured upon the above basis, should then be determined upon and should be distributed during the run in accordance with the percentages. The analysis will almost always show a marked improvement, and if the rate of make per run goes up a further reduction can be tried, providing no very serious clinker trouble develops. At this point emphasis should be laid upon the fact that there is a general tendency to run the fire too soft in order to save labor of clinkering. This should be guarded against, as the saving in cost of a little extra labor once or twice a day during the cleaning period is often more than lost by poor fuel results. At the present high cost of fuel a saving of 1 pound per thousand goes a long way towards paying for labor of cleaning.

The question of up and down runs, or so-called split runs, also has a very important bearing upon fuel economy and clinker formation. In the larger plants, where highly skilled labor can be employed at a high daily wage, the split-run method of operation, by which every run is partly an up and partly a down run, will undoubtedly prove economical. In smaller plants this is not always feasible, and a good general schedule to adhere to is to operate on a basis of two up runs to every down run. In making tests the performance of a machine during the down run should be carefully studied from time to time, as although only about a third of the gas is produced during such runs the checking of their results must not be neglected.

Rate of Air Introduction

The rate of steam introduction, however, is not the only problem which we must study and meet in order to obtain good results in the making of blue gas. As stated above, the temperature of the fuel bed is of vital importance, and this in turn is largely dependent upon the rate of air introduction during the blow. The oxygen in the air when being passed through the fuel can burn either to carbon-dioxide or carbon-monoxide. If only the former were formed the fuel would be heated to a very high state of incandescence, but, on the other hand, the amount of heat available for raising the temperature of the checker brick in the carbureter and superheater would be limited only to that available as sensible heat in the blast gases escaping from the generator. On the other hand, if only carbon monoxide were formed the fuel bed would be left in a relatively cool state and large quantities of heat in the form of producer gas would be available for heating the carbureter and superheater, which, if consumed in those two shells, would either overheat the checker brick in them or, if not burned in the shells, a large quantity of carbon-monoxide formed would escape and burn at the stack, resulting in an enormous waste of generator fuel.

A very hot fire and a carbureter or superheater too cold for proper volatilization and fixing of the oil would result in a relatively large quantity of high quality of blue gas, which, however, could not be enriched to its proper point because sufficient heat for properly carbureting the necessary oil would not be available in the carbureter and superheater. On the other hand, a cold generator accompanied by an excessively hot carbureter and superheater would result in a relatively small quantity of blue gas of poor quality containing large percentages of carbon-dioxide. In order to enrich such gas an amount of oil would be required which, while relatively large for the amount of gas made, would still be a comparatively small amount to be handled per run, and which when injected into an overheated carbureter would, instead of being converted into illuminants, break down into the lighter hydrocarbons, such as methane and lampblack. Such a condition would also result in the reduction of the carbon-dioxide formed in the blue gas by the oil, bringing about the puzzling condition of poor oil results in spite of apparently low carbon-dioxide content in the finished gas.

Blower Capacity Insufficient

A proper balance between the two tendencies of forming either carbon-dioxide or carbon-monoxide must therefore be aimed at, and in order to ascertain that proper results are being obtained analyses of the producer gas made in the generator must be taken from time to time. These had best be collected in the same manner as the blue-gas samples taken during up-runs, and again, both composite samples covering five or six consecutive blows, as well as snap samples taken during various parts of the blow, should be analyzed.

The trouble frequently found is that the blower capacity of the plant under observation is insufficient for most economical results. It has been definitely established that a relatively high rate of flow of air tends toward a production of large quantities of carbon-dioxide, and it is therefore found desirable, even though adhering to a schedule of 1,500 to 1,700 ft. of air per thousand feet of gas made, to introduce this air during as short a blow as feasible in order to obtain as high a rate of flow as possible. Composite samples taken in the manner outlined above should contain approximately 14 per cent carbon-dioxide; if snap samples are taken we must again bear in mind

that the arithmetical average of them does not necessarily represent the true average during the whole blow.

While during a run the carbon-dioxide formed in the process of dissociation of the steam by incandescent fuel gradually increases on account of the decreasing temperature of the fuel bed, the reverse is true during the blow. Here, starting with a relatively cold fire, we heat it up by blasting and thereby tend towards a constantly increasing proportion of carbon-monoxide, essentially a high temperature product. This fact must be taken into consideration in handling the carbureter blast valve. It is of vital importance that the secondary air introduced into the carbureter should be proportioned to the amount of carbon-monoxide available. As this constituent of the producer gas formed in the generator varies as the blow continues, it follows that the amount of carbureter air introduced must be varied correspondingly, gradually increasing from a minimum in the first minute to a maximum in the last. Just enough air to accomplish this at every instant during the blow should be injected; but it must be remembered that while it is true that an excess would tend towards somewhat cooling down the set, such an excess is much less harmful to the fuel economy than a deficiency of secondary air, permitting material quantities of unconsumed carbon-monoxide to escape at the stack.

The third and last intermediary product which should be under close chemical control is the waste gas escaping from the stack. The sampling of this is not an easy matter, and unless great care is observed material errors can be introduced. Two aspirator bottles are necessary, one for producing the suction necessary to maintain a constant flow of gas through the sampling pipe, while the other bottle is needed for actually collecting the samples. The special difficulty encountered in taking samples at this point is due to the fact that the waste gases are not, like the blue gas and generator gas, under pressure, and consequently unless care is taken atmospheric air may be drawn into the sampling bottle. Here again it is unsafe to rely upon the results shown by a single blow, and the analysis should be based upon the average of a composite sample taken during five or six consecutive blows. In order to obtain most satisfactory fuel results the analysis of such a composite sample of stack or waste gases should show up somewhat as follows: Carbon-dioxide, 18 to 19 per cent; oxygen, 0.5 to 1 per cent; carbon-monoxide, 0.3 to 0.4 per cent. An excess of oxygen would, of course, mean too much carbureter blast, while an excess of carbon monoxide would indicate the reverse. It must again be emphasized that an excess of oxygen is not as harmful as the presence of carbon-monoxide much in excess of the above analysis.

In attempting to control the operation of a water-gas set two salient principles must always be kept firmly in mind. When an analysis shows that it is desirable to make changes in the method of operation, only one condition should be altered at one time, and when a factor is changed ample time must be allowed to permit operating conditions in the set to arrive at a balance before making any further changes. Unless this is done no reliable deductions can be formed from analysis of the apparent results obtained by making the change. Furthermore, it is, of course, apparent that when two factors are changed at the same time it will be impossible to ascribe a variation in result definitely to either one of them. In a general way, therefore, after reasonably acceptable results have been obtained no further change in any operating condition should be made at intervals less than one working day.

It will be noted that the several chemical tests described above restrict themselves to the determination of carbon-dioxide, oxygen and carbon-monoxide in the finished gas, the blue water gas, the producer gas and the waste gas. Simple as they are, they must be carried out carefully and at sufficiently frequent periods to keep a continued check on the operations. Nothing more is indispensable, nothing less acceptable.

Work of Men Satisfactorily Performed by Women at Consolidated Company's Plants

In all of the departments of the Consolidated Gas Company of New York except the manufacturing and street departments, the shortage of labor has necessitated the employment of women to perform work theretofore performed by men. In clerical departments and those performing only the lighter grades of mechanical work, this did not seriously impair the efficiency of these departments; and in individual instances the work was performed quite as satisfactorily by women as by men.

It was found, for example, that after instruction women could perform such work as installing, adjusting and regulating incandescent lighting units, burners, mantles, glassware and gas-lighting accessories, and that they could index, lock and unlock meters, execute burner orders, and regulate and repair domestic gas appliances. Schools for instructing them in the performance of these duties were established in each branch office; and, after instruction therein, they were sent out on the district with experienced employees and given practical demonstration in the execution of orders on consumers' premises.

Minneapolis Report Shows Deficit

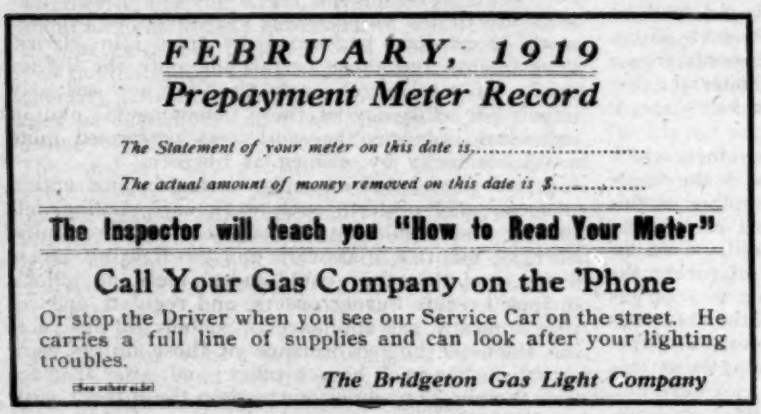
A deficit of $705,684.85 is shown in the income and expenditures statement of the Minneapolis (Minn.) Gas Light Company for 1918 issued recently. There was a loss of $229,547.35 on operations, the statement shows.

R. R. Rand, vice-president and treasurer of the company, said the statement indicates the results of the increased cost of coal and oil and other materials entering into the manufacture of gas, and indicates also the increase in the item of labor.

The gross income of the company is given as $2,266,632.03. The biggest item in the expenses of operation is the manufacturing cost which is put at $1,657,361.83. Other items, including a depreciation item of $227,220, bring the total expenses of operation to $2,496,179.38, resulting in a loss of operations amounting to $229,547.35. Interest on bonds and floating debt, and the sinking fund item for 1918, amounts to $476,135.50, making a total deficit of $705.684.85. In the company's balance sheet fixed assets are placed at $9,236,788.04. Total assets are $10,576,849.60.

Bridgeton Company Fits Motor Trucks Up as Merchandise Cars and Carries Lighting Appliances Direct to Consumers

Efforts Being Directed Exclusively to Increasing Consumption Through Present Meters and Especially to Elimination of Unprofitable Consumer


FEBRUARY, 1919
Prepayment Meter Record
The Statement of your meter on this date is.....
The actual amount of money removed on this date is $.....
The Inspector will teach you "How to Read Your Meter"
Call Your Gas Company on the 'Phone
Or stop the Driver when you see our Service Car on the street. He carries a full line of supplies and can look after your lighting troubles.
The Bridgeton Gas Light Company

BRIDGETON COMPANY USES METER RECORD TO FURTHER CAUSE OF GAS LIGHTING

With a population of 14,000, the Bridgeton Gas Light Company, of Bridgeton, N. J., has installed 3,449 meters.

Their present merchandising efforts are being confined to increasing consumption through these existing meters with particular reference to the unprofitable consumer, the one who uses a small amount of gas and that for cooking only.

Such consumers are being constantly urged to use gas for lighting, and the companies urging are followed up by making the adoption of such a course on the consumer, as easy as it can be made.

Four automobiles are fitted up as merchandise cars and carry lighting appliances directly to the consumer. The result of the effort has been successful to a most gratifying degree.

Apparently the company specializes the C-E-Z lights, but has not neglected possibilities represented in the new "Thrift Burner" put out by the Welsbach Company.

Jacob B. Jones is superintendent and treasurer of the company.

GAS LIGHT EQUIPMENT CARRAED DIRECT TO CONSUMER'S DOOR BY MOTOR TRUCK FITTED UP AS MERCHANDISING CAR

Gas Home the Comfort Home

Anything that tends to increase bodily comfort is sure to attract the buying public and the dealer in gas merchandise who wishes to increase his sales, instead of displaying them haphazard in his window, should ar-

NEWARK GAS COMPANY FINDS THE BEST WAY TO CONVINCE PROSPECT THAT HE WANTS GAS HEATER IS TO SET IT UP IN SURROUNDINGS SIMILAR TO THOSE IN WHICH IT WILL BE PLACED IN HIS HOME

range them in their natural surroundings—that of a well-appointed home. This was the idea of the Newark Public Service Company, Newark, N. J., who in a large show case in the interior of their show room had an entire library fitted up. The floor was covered with a big green rug, and in the background was a green tiled mantel. In this was a gas heater of the Solar Grand type, glowing cheerfully through slides of red isinglass. A vase and a few knickknacks graced the top of the mantel, and a large card beside it observed:

Put a Gas Heater in that idle mantel and make it useful as well as ornamental. At one side of the grate was a large leather upholstered rocker, and at the other a big library

THE GAS LINE

FEBRUARY 8, 1919.

During the extreme Coal Shortage of last winter, the United States Fuel Administration called repeated attention to the WASTE FROM OPEN GAS BURNERS. They urged that all GAS CONSUMED FOR LIGHT should be done through MANTLE BURNERS.

* * * * * *

As a result the THRIFT LIGHT was invented and is now ready for distribution. In fact our Company is the first in New Jersey to receive a shipment from the Welsbach factory.

* * * * * *

THE THRIFT LIGHT does not take the place of the popular C. E.-Z. Light or the Inverted Burners, neither is it intended for general illumination. It is an economical lamp to fill the place now occupied by the wasteful open flame burners in hallways, cellars, and on seldom used fixtures.

* * * * * *

THE THRIFT LIGHT sells complete for TWENTY-FIVE CENTS, the mantle renewals are TEN CENTS each. It is so easy to install that a child can do it.

* * * * * *

Joseph F. Ehrler, Retort House Foreman, entered upon his twenty-second year with this Company on February 1st.

He is the oldest man in point of Service on our Honor Roll. We extend congratulations to a most faithful and loyal employee.

* * * * * *

Lorin E. Allan, Manager of our Lighting Appliance Dept., has some naval banners for the Service Cars, which will appear on the street next week. They call attention to the popular C.E.-Z Light in a striking manner.

THE BRIDGETON GAS LIGHT COMPANY

HOW ADVERTISING MATTER IS USED TO INTRODUCE THRIFT BURNERS WITHOUT NEGLECTING C-E-Z LIGHT

THE GAS LINE

FEBRUARY 15, 1919.

When you have GAS PIPING or LIGHTING EQUIPMENT installed by the GAS COMPANY you deal DIRECT.

* * * * * *

OUR INTEREST DOES NOT CEASE when the work is completed and the account paid.

* * * * * *

IT CONTINUES EVERY DAY IN THE YEAR, for only by giving SATISFACTORY SERVICE will you continue to use our product—which is to say—GAS.

* * * * * *

That is why GAS COMPANY SERVICE means so much. With every installation made by us, goes the GUARANTEE of DEPENDABLE and SATISFACTORY SERVICE.

* * * * * *

The new SALESROOM has just been completed. It is located on the Second Floor of our Storage Warehouse on Water Street. It is not to say a very elaborate salesroom—but, we show the latest things in Lighting FIXTURES, and GAS APPLIANCES—Also we sell the BEST at the LOWEST COST, as we have no selling expense.

* * * * * *

The THRIFT LIGHT which we announced last week, has gained instant popularity. This little lamp gives three times the light of the Flat Flame Gas Burner and consumes only one-fourth the Gas.

* * * * * *

The price of the THRIFT LIGHT is only 25 cents. It is intended for use in Bedrooms, Bathrooms, Hallways and for Cellar Lights. It is designed to eliminate the flat flame burner and SAVE GAS.

THE BRIDGETON GAS LIGHT COMPANY

BRIDGETON COMPANY INSERTS WEEKLY AD IN LOCAL PAPERS GIVING BRIEF SUMMARY OF ITS ACTIVITIES

table with leather throw, on which were several books and a gas lamp with art glass shade. A card set in a brass frame advised:

This Gas Table Lamp is one of the many pleasing designs we are offering for your approval. Gas light is eye-pleasing—and the cheerfully lighted home is the best lure of the fireside.

The catchy cards added to the pulling power of the display, and the comfortable appearance of the entire room was calculated to make all who saw it wish for a similar one for themselves.

Saving by the Use of Mantles

A salesman may talk all day about the saving occasioned by the use of mantles in comparison with the amount of gas consumed by the open flame, but most people are from Missouri and want to be "shown." The Baltimore (Md.) Gas Company accordingly, are "showing" them by a very effective window demonstration, just what the advantages of the mantle really are. The floor was covered with an Oriental rug and in the centre was a card 4 x 6 ft. on which was printed in bold black letters:

FIX THIS FACT FIRMLY IN YOUR MIND, AND DON'T FORGET IT

Every time you light an open flame burner you waste half the gas. At either side, on pedestals draped with crimson velvet, were gas jets, the one showing the old-fashioned open flame, the other encompassed with a mantle. Attached to the rod carrying the open flame jet was a card, lettered in red:

Two times the gas;
one-half the light

and at the bottom was another card:

The average open flame burner uses approximately six to seven feet of gas per hour.

Attached to the second rod was a card:

Two times the light;
one-half the gas

while the card beneath advised:

The mantle burner uses approximately three feet of gas per hour.

Attached to each burner were large dials, with hands slowly moving around the face, the hands on one moving much more rapidly than on the other. A card in the corner of the window urged the practical-minded gas consumer:

Watch the dials. The gas is being registered by meters.

Gas Mantles for Lunch

The Public Service Company of Trenton, N. J., recently displayed a "light lunch" that first amused and afterwards interested scores of passers-by. The window was designed to draw attention to their gas mantles—and it certainly succeeded. There was a walnut dining table set for lunch, with little lace paper mats at each place. At each place was a plate and a sauce dish, the plate holding a mantle in wire frame, and the smaller dish a small mantle. The centerpiece was a large globe for a gas lamp, filled with ferns. Other dishes held mantles in pasteboard cartons, and a card attached to the cloth advised: "Assorted Mantle Stock, Always Fresh." The floor was covered with a warm looking cherry-hued rug, and down in front, in a brass frame, was another card:

GAS LIGHT IS GOOD LIGHT
We are prepared to supply every gas light requirement.

When Grandfather Was a Boy

The G. H. Turner Company, Los Angeles, Cal., have recently been conducting a campaign for modern improvements in homes, both old and new, and their ads, "When Grandfather Was a Boy," have brought the question of gas installation to the notice of hundreds who had previously given little thought to the matter. They took a quarter of a page in the local papers, which they adorned with a picture of a youngster splashing about in a big wash tub, while in the background was an old-fashioned open fireplace. The ad was headed:

WHEN GRANDFATHER WAS A BOY

You smile, perhaps, but wait, However crude his bathing facilities were, maybe he had the best obtainable at that time.

Can *you* say the same of *your* present equipment, or that which you contemplate placing in your new home?

Acquaint yourself with the gas water heater, that makes so much for comfort and convenience. Hot water when you want it, where you want it, and as much as you want.

G. H. TURNER CO.

This ad was complemented by an attractive window display, which showed one of the old-fashioned tubs, in which was the life size, weeping figure of a small boy. Down in front was a card:

HE WANTS A WARM AND COMFORTABLE BATHROOM

Put a little gas heater in his room and see his tears turn to smiles.

Hard to Define Psychology

It would be difficult to state just what psychology is, although I can state, in a way, what the psychologist studies, declared Dr. Lightner Witmer, of the Department of Psychology of the University of Pennsylvania, at a recent luncheon address at the Engineers' Club of Philadelphia. He studies just what you are compelled to study every day of your life, and that is human performance—the behavior of human beings and animals—such behavior as is accompanied by consciousness, or for the explanation of which we are compelled to assume the existence of consciousness. Such is the province of the modern science of psychology. We study mind, therefore, only indirectly through the performance of those whom we observe. When I test a student in my psychological laboratory, or when parents bring children to my laboratory for the purpose of having them examined and tested, all that my tests do is to provide a material means or agency by which I cause the child to perform in my presence, so that I can observe in a number of well-regulated tests what kind of performance he is capable of rendering.

Tri City Company Allowed Increased Rate

The Alabama Public Service Commission recently granted the petition of the Tri City Gas Company, of Gadsden, to increase the price of gas to $1.65 per 1,000 cu. ft. The petition for an increase in the minimum charge was denied. The increase effective Feb. 10.

The $500,000 Producer Gas-Electric Plant Sold for Junk

A Correction

In the Jan. 25 issue of the AMERICAN GAS ENGINEERING JOURNAL there appeared on page 87 an article headed "$500,000 Gas Plant Sold for Junk. Machinery out of date." This article described the plant being dismantled as having been regarded "five years ago as near the last word in modern gas generating equipment," and that "the type of machinery has been so rapidly supplanted by new inventions . . . that the continued operation of this plant did not seem profitable . . ."

From the real story as now ascertained, it would appear that the above statements are somewhat misleading, though the actual facts emerge in a rather vague manner in the last paragraph where it was said "the plant was built to utilize gas from the local plant where the machinery and processes used converted the gas into power to be used in propelling street cars and other general power purposes."

The history of the matter is that some ten years ago the Southern Public Utilities Company installed four sets of standard producer gas-apparatus which in connection with two gas-engine driven electric generators (750 k.w.) supplied power for street railway operation and other purposes. After this apparatus had been operated for about eighteen months, the Utilities Company suspended its operation because they found it cheaper to purchase current from the new hydro-electric power plant on the Catawba River. This electric generating equipment is now being scrapped because, due to the increased demand for current, its capacity is too small for it to be considered any longer as a reserve.

This electric generating apparatus driven by gas-engines was not scrapped because of the "rapid progress of invention," but because that type of equipment cannot be advantageously operated in competition with a hydro-electric generating plant. Under any conditions where a gas-engine driven equipment would be economical, the apparatus which has just gone to the scrap pile would have been as efficient as any built to-day. The plant is now being operated as a coal gas plant.

Ohio Fuel Supply to Pay City $360,000

Representatives of the Ohio Fuel Supply Company have agreed to pay the City of Columbus the full amount due in accordance with the decision of the United States supreme court recently.

The suit came about as the result of the city charging that the company had not carried out the bonus terms of the franchise.

Up to July 1, 1916, the total amount due was in the vicinity of $440,000.

A certified check for $200,000 is to be given and liberty bonds to the extent of $160,000 are to be deposited with City Treasurer Jenkins as security for the remainder of the $360,000. The $160,000 is to be paid in three installments, three, six and nine months.

Explosion at Platteville, Wis. Causes $75,000 Damage

Explosion of a gas stove and several cans of gasoline standing nearby, caused a $75,000 fire in Platteville, Wis., Saturday afternoon, Feb. 8, in which eight persons lost their lives and eleven were severely hurt. The south wall of the building was blown into the street.

Annual Meeting of New England Association of Gas Engineers Characterized by Large Attendance

A. M. Barnes Elected President for Ensuing Year—Discussion on Gas Lighting for Churches—Employment of Women in the Industry—Affiliated with American Gas Association

The forty-ninth annual meeting of the New England Association of Gas Engineers was held at the Copley-Plaza Hotel, Boston, Feb. 19 and 20, with an attendance of over 200.

J. Arnold Norcross, the president, opened the meeting at 10.30 a. m., after which followed the election of new members as follows: E. S. Stack, president, Stack Heater Company, Boston; Edward H. Bauer, superintendent, Providence (R. I.) Gas Company; Robert B. Buxton, chemist, Lynn (Mass.) Gas & Electric Light Company; Roger B. Brown, chemical engineer, Brockton (Mass.) Gas Light Company; Reginald H. Sheldon, industrial engineer, Brockton Gas Light Company; J. C. McAfee, foreman high-pressure system, Brockton Gas Light Company; Arthur F. Short, secretary and treasurer, Providence (R. I.) Gas Company; Charles J. G. Haas, traveling representative, H. Mueller Manufacturing Company, Brookline; William E. Vandell, superintendent of gas manufacture, Fitchburg (Mass.) Gas & Electric Light Company; Arthur W. Darby, superintendent, City of Holyoke Gas and Electric Department; Ralph S. Carter, superintendent, Malden (Mass.) & Melrose Gas Light Company; Howard L. Olds, vice-president, Twin State Gas & Electric Company, Boston; Walter M. Russell, superintendent of manufacture, Providence Gas Company; William C. Brock, superintendent, Citizens Gas, Electric & Power Company, Nantucket, Mass.; Warren D. Stewart, superintendent of works, Fall River (Mass.) Gas Works Company; E. C. Weston, secretary and treasurer, Middletown (Conn.) Gas Light Company; Charles S. Mor-

gan, general manager, Strafford-York Gas Company, Rochester, N. H.; Ralph L. Fletcher, assistant engineer of manufacture, Providence Gas Company.

The president then read the names of those members who had died during the past year, all present standing during the reading.

The secretary read letters addressed to the association from the following: E. C. Jones, Samuel Bodine, Frank P. Stone, Arthur Hewitt, H. L. Sterrett and George G. Ramsdell.

The president's address followed.

Affiliation with American Gas Association

The secretary read a letter from the American Gas Association on the matter of the affiliation of the New England Association with the American Gas Association, which was referred to a committee for report.

Mr. Wrightington, of the committee to take up the question of affiliation with the American Gas Association, reported favorably on the plan, which was adopted by the association.

The New England Association of Gas Engineers will have four members, one each to be a member of the technical, manufacturing, accounting and commercial sections of the American Gas Assocation. The president is to be one of the delegates and will appoint the other three.

Gas Lighting in Churches

Philmer Eves read a paper on "Church Lighting by Gas."

Waldo Learned, Newton, Mass., stated that the majority of the church committee in Newton were users of electricity, and were prejudiced against gas. They were persuaded to allow a trial demonstration of gas for lighting the church. The new installation proved very satisfactory and is in operation now.

J. P. Kennedy, of Cambridge, said that plans had been made to install electricity in a church in Cambridge, when the pastor was persuaded to allow the replacing of the present gas fixtures for others of up-to-date construction, which resulted in a new installation using gas, much to the satisfaction of everyone, many expressing the opinion that they did not know gas could be used to such excellent advantage for lighting. A green shade was used and so arranged that no one in any part of the church could see the light. Lights should be inspected at least once a month.

V. E. Bird, of Cambridge, said that the maintenance of gas lighting was very important, and more attention must be given to this end to preserve gas for lighting.

Thomas B. Sucher, of New Haven, read a paper on "Bonus on Tire Mileage."

Dr. J. F. Wing read a report of the committee on coal and oil supply, giving the results accomplished during 1918 in keeping the gas companies of New England supplied with coal and oil.

The officers for the ensuing year were elected as follows: President, A. M. Barnes; first vice-president, W. F. Norton; second vice-president, Burton Smart, and secretary and treasurer, Nathaniel W. Gifford. The following directors were elected: H. N. Cheney, V. E. Bird, R. E. Wyant, C. E. Paige and C. R. Pritchard.

Mr. Barnes in a speech accepting the office of president stated that he felt he had been specially honored, as he thought he was the first man elected to the presidency of the New England Association of Gas Engineers who was not a gas engineer.

From the Question Box

Mr. Nixon, superintendent of the Pittsfield (Mass.) Gas Company, stated that thirty miles of welded mains in Pittsfield had been down three years, two years of which the frost was 5 ft. deep, but had not had a single break.

Many methods of thawing frozen ground for laying new mains or repairing leaks. One of the methods used was to lay on the surface 400 ft. of 3 inch pipe, cover this with burlap and snow if there was any, and then turn on steam generated in a portable boiler. Three hours will take the frost out of the ground to a depth of 1½ to 2 ft. It was stated that in Alaska when the frost enters the ground to a great depth, ¾ inch pipe perforated with 3/16 inch holes with a drill head is driven into the ground to a depth of 5 ft. Hot water is forced into this pipe which seaps through the holes and thus removes the frost. It was found that hot water was found far more efficient and economical than any other method.

Women in Industry

A paper by George H. Priest on the "Employment of Women as a New Factor in the Gas Industry" was read.

There was considerable discussion on this matter. At New Haven the employment of women in the maintenance department was tried out during 1918. In some respects their service was ahead of that of the men, but it was found that a whole the women were found to be less reliable, that is, the average hours of work for the men per month was considerably higher than by the women employees.

The banquet was held on Wednesday evening at 6.30 p. m, at the Copley-Plaza Hotel and was largely attended.

Citizens Gas Company of Carroll, Ia., Under New Management

As the result of the transfer of the largest single block of stock in that concern recently, the Citizens Gas Company, of Carroll, Ia., has passed under new control. W. B. Swaney will be the new president of the corporation, succeeding J. B. Hungerford, who has disposed of his interests in the concern, according to an announcement made this morning. M. J. Kelly will be vice-president, John Roelfsema secretary, while H. J. Kane will be retained as manager.

The new management announces that a progressive policy will be pursued by the concern, looking toward its growth and development in accordance with the needs of the city. Considerable new machinery will be installed in the plant, and everything will be modernized throughout. Expansions in the mains system, calculated to take care of a larger number of customers are being planned, and the service will be improved generally.

Due somewhat to conditions resulting from the war, the gas company has been through an embarassing period in the past few weeks, but it is the intention of the new management to correct these conditions regardless of cost, and to make the company a leader in the live industries of the city.

Southern Counties Gas Company Pays Franchise Tax for Period of Six Years

The cities of Santa Ana and Orange, Cal., received checks from the Southern Counties Gas Companies for more than $10,000, the checks having been sent in payment of franchise taxes in the two cities for a period of six years in Santa Ana and seven years in Orange.

The check for Santa Ana is $8,373.88, being the franchise tax on gross earnings of the company in this city of $418,693.99 between February, 1913, and Dec. 31, 1918. The amount received by Orange was $2,202.80 for the period between May, 1912, and Dec. 31, 1918.

Lynn Rates Reduced

The Lynn (Mass.) Gas & Electric Company recently notified the City Council that it would reduce the price of gas to consumers 5 cents on April 1 and an additional 5 cents on July 1. In six months they will reduce the price 25 cents, making it a $1 flat rate.

Westfield Municipal Plant Reports Loss for Gas Department

Net profits of the Westfield (Mass.) Municipal Light Department for the fiscal year ending Dec. 31, amounted to $2,220.87, according to the annual report of Clarence A. Kinard, the manager. Net profits were shown in the electrical and store departments of the light works, while the gas department showed a loss. The store account which in other years has proven a loss to the department showed a balance of $2,020.25 net profit. The net profit in the electrical side of the business showed a balance of $9,080.40. The net loss from gas manufacture and sales amounted to $8,880.78.

The statement of the gas department showed a gross profit of $9,585.65 with deductions of $18,474.43, which was represented in $3,324.38 for interest, $8,410.65 for depreciation and $6,739.40 for bonds. The electrical department statement showed a gross profit of $34,343.54 with deductions of $25,263.14, represented by $4,568.04 for interest, $11,434.50 for depreciation and $9,260.60 for bonds.

Manufacture of both gas and electricity was conducted at a higher expense to the department than in 1917. Gas distribution and overhead was higher, while the electricity overhead remained about the same and the electricity distribution was at a lesser cost. Cost of manufacture of gas in 1918 amounted to $1,638 a cubic foot as against a cost of $1,397 the previous year.

Commercial Section of American Gas Association Holds Important Meeting

Monthly Window Decorating Service Approved—Additional Committees Appointed

The Managing Committee and Chairmen of Committees of the Commercial Section of the American Gas Association held a joint meeting at association headquarters on Tuesday afternoon, Feb. 11.

Those present were: E. N. Wrightton, chairman; W. J. Clark, C. M. Cohn, R. C. Congdon, 0. T. Knight, E. J. Rutledge, J. D. Shattuck, Thomson King, R. B. Doull, J. P. Hanlan, G. S. Barros, Louis Stola, W. A. Ehlers and Jansen Haines.

Industrial Fuel Committee

The Managing Committee approved the revision of the Industrial Fuel Committee and the following members were appointed: Thomson King, chairman; F. A. Tuttle, H. H. Clark, W. W. Cummings, H. O. Loebell, Bruno Hahn, H. L. Read, S. T. Willson, I. Lundgaard, H. Vittinghoff, E. B. Myers, W. T. Rasch, F. F. Cauley, J. L. Richards, C. A. Schuldt, James F. Reynolds, Wm. Berry.

The report of the chairman of the Industrial Fuel Committee was then presented and followed by a thorough discussion, in the course of which it was decided that the services of W. A. Ehlers, as industrial fuel engineer of the association, be available only to company members and on a rate basis identical with that used by the N. C. G. A. for such services. Mr. Ehlers, it was decided, shall at this time make work in the field his first concern, with whatever interims there may be employed at headquarters in the preparation of pamphlets and other material for promoting the industrial use of gas.

The committee agreed to recommend to the executive board that an appropriation of $1,000 be made available to the Industrial Fuel Committee for the carrying out such special work as the testing and development of gas appliances, etc. The need for a laboratory where appliances for special purposes might be developed received special emphasis.

The chairman of the Industrial Fuel Committee was instructed to prepare a definite recommendation concerning a course or courses in industrial fuel and the advisability of the association undertaking their preparation.

Sales Development Committee

The Managing Committee approved the appointment of the following Sales Development Committee of which J. P. Hanlan is chairman. H. N. McConnell, Fenton Kelsey, R. Kidde, P. B. Wiske, Lee H. Newbert.

Mr. Hanlan made a verbal report concerning the work of his committee in preparing a paper for the March conference, and outlined the general plans of the committee to encourage increased appliance sales and the organization of self-supporting or profitable sales departments in gas companies. One of the special considerations of the committee is the formulation of a system of remuneration for salesmen that will suit both employee and company.

This committee will also deal with such matters as the means of educating consumers to make minor adjustments on gas equipment.

Illumination Committee

The Managing Committee approved the appointment of the following Illumination Committee: C. O. Bond, chairman; Dr. Howard Lyon, C. A. Luther, F. V. Westermeier, C. E. Reinicker, W. G. Hoyt, J. P. Conroy, J. C. D. Clark, J. J. Burns, John A. Doyle, James Fernier, Geo. W. Allen.

Heating Committee

The committee approved the appointment of the following Heating Committee: George S. Barrows and W. W. Cummings, co-chairmen; Thomson King, George E. Bennitt, C. L. Bryant, J. J. Burns, Chas. O. Frary, W. H. Taylor, R. Kidde, F. S. Wade, C. C. Winterstein, E. V. Daily, A. H. Humphreys, L. B. Newbert, E. J. Burke.

The chairman stated that a report was being prepared and that one of

the most important subjects to be considered was the attitude of gas companies toward the taking on of a heating load. It was agreed that definite data must be obtained before conclusions could be reached on such matters.

RELATIONS WITH ARCHITECTS, CONTRACTORS AND DEALERS

The names of B. Olsen and Lee H. Newbert were added to the approved list for this committee. The committee will make an attempt to establish relations with the American Institute of Architects.

As suggested, Mr. Doull will also give attention to the establishing of co-operative relations with plumbers and steam fitters.

WINDOW AND SHOW ROOM DISPLAY

A committee consisting of S. H. Alexander, chairman; Lawrence A. Heiss, John R. Fenniman, T. W. Leviness, was approved. The committee has decided, with the approval of the Managing Committee, to furnish to member companies without charge, and to non-member companies at a price to be determined, a monthly window decoration service of four original displays. In addition, window screens, posters and other materials will be prepared and offered from time to time.

Before adjourning, the Committee recommended that the scope of the Committee on Industrial Codes be broadened to include such considerations as the possibility of legislation directed against gas companies because of improper installations, such as heating stoves and boilers under wrong conditions, made often by other agencies.

Lowell Company Purchases Group Life Insurance for Its Employees

The Lowell (Mass.) Gas Light Company has entered upon a plan by which its employees are to receive at its expense the benefit of group life insurance, one of the recognized modern methods of protecting employees of large concerns. The Lowell Gas Light Company probably is the first employer of labor on a large scale in Lowell thus to insure its employees.

Under the plan adopted, each employee, after completing six months to one year of continuous service with the company will receive $500 life insurance, and $100 additional for each year of continuous service up to and including the fifth year when the maximum of $1,000 will be reached. Under this plan, recognition is given faithful and continuous service by the increased amount of insurance given each employee.

This insurance plan, it is stated, has been undertaken by the company for the purpose of manifesting its serious interest in the welfare of its organization and to promote a spirit of co-operation and helpfulness both in the daily task and in the home.

Personal Notes

IRVING D. FOWLER has resigned his position as new business manager of the Meriden (Conn.) Gas Light Company, and accepted a position with the Weir Stove Company of Taunton, Mass. Mr. Fowler has been connected with the Meriden company for the past twelve years, including fifteen months in the service. He was discharged in December and immediately resumed his duties with the gas company. Mr. Fowler is representing the stove company in Connecticut and eastern New York.

LEE BENOIST has resigned as president of the New Orleans (La.) Gas Light Company and J. D. O'Keefe has succeeded him. Mr. Benoist has been president of the gas company two years. Mr. O'Keefe is vice-president of the Whitney-Central Bank and receiver of the New Orleans Railway and Light Company. The receivership does not extend to the gas company, that organization being perfectly solvent. The gas company, however, is owned by the same interests that own the railway and electric light utilities. Mr. Benoist continues as a director of the company. What his future movements will be is not known. It is supposed, however, that he will go East, where his family is.

EDWARD A. MCCARTHY, of Savannah, Ga., who held a responsible position with the Savannah Gas Company there for a number of years, has resigned his position in order to locate in the North. He is now at the home of his parents in Turner Falls, Mass., before assuming his new position as a traveling salesman for gas appliances. Mr. McCarthy has been connected with gas companies for many years and knows the gas business thoroughly.

GEORGE L. WILKINS, head of the commercial department of the Wisconsin Public Service Company, Green Bay, Wis., for the last two years, who resigned the position, left recently for Milwaukee to assume a position with the Illinois Electric Company as that company's southwestern Wisconsin representative. His headquarters will be in Milwaukee. In the last year Mr. Wilkins has been prominently identified with war work as assistant federal food administrator for Brown County, chairman of the price interpreting board, chairman of the threshing division of the food administration. Mr. Wilkins was commercial manager with the Sheboygan Gas Light Company, and prior to that connection he was affiliated with the Eastern Wisconsin Railway & Light Company in Fond du Lac, and in that company's main office in Milwaukee. The territory which Mr. Wilkins will cover includes Green Bay, and cities south of there.

R. B. INGLE, for the past five years manager of the Perry (Ia.) Gas Company, has resigned his position to accept a place with the Rude Auto Company as office manager at Cedar Rapids.

ELMER E. CLAY, who for the past year has been connected with the Greencastle (Ind.) Gas & Electric Light Company as manager, has accepted a similar position with the Columbus (Ind.) Gas Light Company.

LIEUTENANT L. F. BLYLER, new business manager of the Minneapolis (Minn.) Gas Light Company, recently received his honorable discharge from the U. S. Army.

CHARLES A. MONROE, vice-president of the Public Service Company of Northern Illinois, has been made vice-president of the Peoples Gas Light & Coke Company. Under the direction of Samuel Insull, chairman of the board of directors, Mr. Monroe has taken active charge of the company's organization. E. G. Cowdery, president of the company, who has been the active head of the corporation, has been given a leave of absence.

THE HARTFORD CITY (CONN.)

GAS LIGHT COMPANY held its annual meeting recently at which the following directors were elected: E. B. Bennett, Francis R. Cooley, James H. Knight, John T. Robinson, Morgan G. Bulkeley, Jr., Frank C. Sumner and Philip Roberts of Hartford and J. J. Bodell and Louis C. Gerry of Providence, R. I. The directors will meet Thursday, Jan. 30, for the annual election of officers.

THE NEW BRITAIN (CONN.) GAS LIGHT COMPANY held the annual meeting Feb. 3 at which the directors for the coming year were elected. Henry E. Russell of New London, F. M. Travis of Torrington, Edward N. Stanley, R. S. Brown, Harold T. Sloper, A. J. Sloper, Judge John J. Walsh. The directors will elect officers later.

THE JEFFERSON COUNTY GAS COMPANY, Warren Pa., at its annual meeting elected the following officers: Frank Packy, president; Samuel Peterson, vice-president; Dr. C. J. Frantz, secretary. The board of directors include the foregoing and James Edwards, Wm. Richards, D. M. Brasted and F. Eugene Smith of Elmira.

THE PENNSYLVANIA GAS COMPANY held its annual meeting at Warren, Pa. Raymond Cross, Jerry Crary, L. L. Graham, O. W. Beaty, W. J. Judge, F. E. Hertzel, E. D. Wetmore, T. R. Weymouth and H. H. McConnell were chosen directors. The officers chosen were Raymond Cross, president; Jerry Crary, L. L. Graham, O. W. Beatty, H. H. McConnell, vice-presidents; J. W. Kitchin, secretary and treasurer; W. J. Judge, assistant secretary and treasurer; Charles F. Huff, superintendent, and T. R. Weymouth, chief engineer.

DAVID OLIVER HOLBROOK, aged 47, one of the greatest authorities on natural gas problems in America, and head of the division of natural gas in the United States Food Administration, died Feb. 16 of acute indigestion. He was secretary and treasurer of the Natural Gas Association of America, president of the Natural Gas Supply Men's Association and vice-president of the Dayton Pipe Coupling Company.

PAUL LUPKE, writer on gas and electric service, and employed by the Trenton Public Service Corporation as editor of *Service*, one of the company's organs, died Feb. 9 at his home in Trenton. He had been superintendent of the South Jersey Gas & Electric Company for many years.

Societies and Associations

THE IOWA DISTRICT GAS ASSOCIATION held a meeting of the officers and council recently at which it was decided to hold the fourteenth annual convention at Lincoln, Neb., on Wednesday and Thursday, May 21 and 22. J. E. Harsh, manager of the Lincoln Gas & Electric Company, will make the local arrangements for the sessions and entertainment. C. N. Chubb, general manager of the Peoples Gas Company of Davenport, Ia., will act as chairman of the program committee, so that a rousing victory convention is assured.

THE WISCONSIN GAS ASSOCIATION will hold its annual convention in Milwaukee March 25-26. Several hundred gas men from all parts of Wisconsin and neighboring States will attend the convention. The tentative program, as outlined by Secretary Henry Harmon, indicates that the convention will be the largest ever held by the State organization.

THE NATURAL GAS ASSOCIATION and THE GAS MEN'S SUPPLY ASSOCIATION, will hold a joint convention of about 900 delegates in Cleveland May 20-23. In all probability the Ohio Gas & Oil Association will convene at the same time. Arrangements for the convention have been completed by G. O. Holbrook, of Pittsburgh, secretary of the gas association, and Larmore Adams, secretary of the supply association. The meetings and the exhibit of gas appliances will be held at the Central armory.

THE MUTUAL AID SOCIETY OF THE CAMBRIDGE (MASS.) GAS LIGHT COMPANY held a monster cabaret and dancing carnival in Elks' ballroom, Central Square, Feb. 14. The entertainment included feature dancing by John and Annie Bradley, clever eccentric performers; singing by the Gas Light Trio, Walter Johnson, Joseph Keough and Charles Johnson; solo song and dance, Sadie Campbell, assisted by Leo Feist and Irving Berlin; challenge contest between Joseph Bradley and Gertrude Sullivan, and Russell Howard and Kathlyn Tobin; selections from Keith's circuit.

Activities of Empire Gas & Electric Company

The Empire Gas & Electric Company of Newark, N. Y., has taken an active part in putting over Liberty Loan and War Chest. Their offices have been used as headquarters for Liberty Loan contributions and is now being used as headquarters for the war chest, furnishing one clerk to take care of the records and receipts. Assisted by striking window displays and personal efforts of the superintendent $5,000 monthly is collected.

All returning soldiers are receiving back old positions at the advanced wages paid other employees.

Strong commercial campaigns are now being planned by a committee consisting of W. J. Callanan, district manager at Newark; C. F. Brunt, superintendent at Geneva; Mr. Moran, new business manager, and A. D. Smith, electric superintendent at Auburn, to look up the matter of extended credit and quick turn overs in merchandising stocks.

Construction Notes

New Coal Gas Plant Contemplated for Quincy

The Quincy Gas, Electric Light & Heating Company of Quincy, Illinois, are contemplating the construction of a new coal gas plant. If conditions permit the company hopes to put it in this year, but this will depend largely on financial conditions.

H. O. Channon is manager for this company.

Improvements Proposed by Holyoke Municipal Plant

The City of Holyoke (Mass.) Gas & Electric Department, of which John J. Kirkpatrick is manager, proposes to make many improvements at the gas works.

The extensions proposed consist of the installation of new water gas apparatus for increasing the capacity of the present plant including a new meter, exhauster, tar extractor and washer. Also coke and coal handling apparatus.

Improvements Being Made at Bridgeton N. J.

J. H. Gautier & Company are now engaged in resetting three of the half-depth benches of 6's for the Bridgeton (N. J.) Gas Light Company. They also have an order for four more benches of 6's to be reset early in the fall.

Pipe is already on the ground for the purpose of extending street mains. This extension will be somewhat limited, as the company has a service pipe in practically every property in the city, and the town is completely piped to the city line in every direction.

This JOURNAL is indebted to Jacob B. Jones, superintendent of the company, for the foregoing information.

Many Improvements to Be Made at Westfield Plant This Year

The Westfield Gas & Electric Light Works of Westfield, Mass., are going to install a water gas set, purifier and unloading device during the present year.

C. A. Kinard is managing this municipal plant.

Chicago Company's Report Shows Deficit for 1918

The Peoples Gas, Light & Coke Company in the year 1918 earned less than $1,000,000 with which to pay bond interest amounting to $2,366,150 and achieved a deficit of $1,366,628. This compares to a deficit of $365,201 in the previous year.

The deficit was made up by the appropriation of all the $1,092,813 in the contingent reserve fund and the balance from surplus. How far the finances of the company had fallen is shown by the fact that working capital at the end of the year amounted to only $1,185,093, as compared to $2,986,277 a year before and $5,492,661 two years previous.

Conditions were even worse at the end of August, when Samuel Insull, chairman of the board, began his "house cleaning," and increased rates began to apply. In the first eight months of the year the company earned practically nothing toward bond interest and had accumulated a deficit of $1,502,218. In the last four months of the year a surplus after interest was reported amounting to $100,827.

The company is said to be earning something in excess of charges now. The detailed report will be found interesting to the studious shareholder. It shows that gas which cost an average of 88.43 cents a thousand feet to make and deliver was sold for 83.16 cents a thousand. It also shows that gas making fuel increased in cost $6,314,238 between 1915 and 1918. After accounting for increased production, it is shown that costs increased nearly $5,000,000 in the five years.

Chairman Insull says of the prospect:

"It is hoped as a result of the increased rates for gas and the expectation of decreased cost, in consequences of the stoppage of war activities, that the year 1919 will show a greatly improved condition of the revenue account, notwithstanding the reduction of income owing to the stoppage of the Government demand for light oils.

"Notwithstanding the unsatisfactory condition of the company's finances resulting from the heavy losses of the first eight months of the year, your directors felt it incumbent on them to enter into contracts for the purpose of accumulating large supplies of oil, coke, coal and other materials to guard against the difficulties of transportation and supply during the war times. The signing of the armistice and the approaching peace render this policy no longer necessary, and as rapidly as these supplies can be used the money tied up in them will be released and applied to reduce the company's current indebtedness."

The report expresses the confidence that there is no longer any reason for the company to fear suits for the collection of the $10,000,000 claimed by the city as an overcharge nor suits to reduce rates. One of the results of the difficulty over erroneous gas bills was that bills due on Dec. 31, 1918, were $2,218,232, as compared to $1,346,769 a year previous. It is indicated that work on the new coal gas plants will be begun as soon as the directors are able to finance the work.

INCOME ACCOUNT COMPARED

The income account compares as follows:

ASSETS

	1918	1917
Real estate, franchise, etc.	$94,985,710	$99,307,279
Green Street and other property	159,526	159,527
Special deposits	1,450,974	1,362,172
Deferred charges	6,707,536	967,726
Inventories	3,794,150	2,344,660
Gas accounts receivable	2,218,232	2,524,361
Sundry accounts receivable	1,392,661	.....
Deposits with agencies for bond coupons	354,740	333,725
Cash	219,657	1,364,725
Totals	$111,283,190	$108,364,306

LIABILITIES

	1918	1917
Capital stock: Authorized $50,000,000; issued	$38,500,000	$38,500,000
Underlying prior lien bonds	24,077,000	24,077,000
Refunding mortgage bonds of 1897	20,554,000	20,554,000
General and refunding bonds of 1913	1,712,000	1,712,000
Deposits, security for gas bills, etc	41,538	335,379
Accounts payable	2,737,927	2,429,663
Bills payable	2,157,643	.....
Taxes accrued	1,061,481	.....
Bond interest due and accrued	837,298	816,283
Depreciation and other reserves	8,136,883	7,802,955
Surplus	11,047,598	12,137,125
Totals	$111,283,190	$108,364,306

INCOME ACCOUNT

	1918	1917
Gross income	$21,588,400	$19,338,638
Operating expense	18,934,319	15,866,738
Operating income	2,654,080	3,471,900
Depreciation and other reserves	1,654,559	1,461,954
Net	999,521	2,009,949
Bond interest	2,366,150	2,375,150
Deficit	1,366,628	365,201
Made up out of contingent reserve	1,092,813	.....
Made up out of surplus	273,814	1,366,628

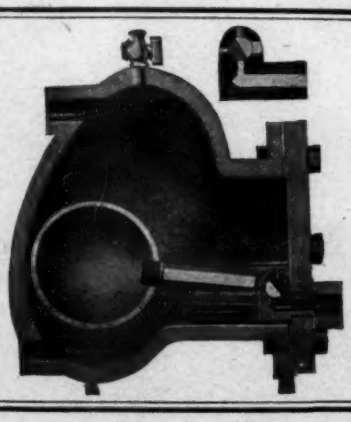
GAS
HOLDERS

RITER-CONLEY
—CO.—

PITTSBURGH

COAL
GAS
PLANTS

GENERAL STEEL CONSTRUCTION



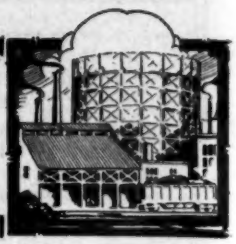
CORLISS VALVE STEAM TRAP
Guaranteed for Two Years' Service Always,
But Sent on Trial if so Desired

Circular No. 8 sent on request.

PLANT ENGINEERING & EQUIPMENT CO., Inc.
6 Church Street New York City

San Francisco, Cal., 58 Sutter St.
Hartford, Conn., 330 Pearl St.
Chicago, Ill., Peoples Gas Bldg.
Indianapolis, Ind., 222 Hume-Mansur Bldg.
New Orleans, La., 917 Hennen Bldg.
Boston, Mass., 10 High St.
Detroit, Mich., 814 Penobscot Bldg.
Milwaukee, Wis., 3 Bradley Bldg.
Columbus, Miss., W. F. Vinton
Minneapolis, Minn., Metropolitan Bank Bldg.
Omaha, Neb., 804 First Nat'l Bank Bldg.
Elizabeth, N. J., 122 Elm St.
New York City, N. Y., 6 Church St.
Rochester, N. Y., 305 Chamber of Commerce Bldg.
Troy, N. Y., 422 River St.
Philadelphia, Pa., 1503 Samson St.
Pittsburgh, Pa., 1204 Hartje Bldg.
Havana, Cuba, Cuba No. 3

With The Equipment & Appliance Manufacturers



Conducted by Business Department of American Gas Engineering Journal

Trouble? Unnecessary Trouble!!

2 A. M. Telephone bell! Superintendent's home—night foreman at works (on other end of wire). "Sorry to disturb you, sir, but we have had trouble in engine room. The big blower engine caught a dose of water, cylinder head sprung, connecting rod badly bent, crank pin out of line. Have started up old blowers but the blast pressure is low; will have to drop down a machine, and trust to luck that the weather moderates."

Superintendent—* * * "Just what I expected might happen. Always said that each blower engine should have a good separator and a reliable trap, and have meant to put them on but haven't had time to pick out the right one." (To himself) "Now procrastination has cost me all kinds of trouble, besides about a thousand dollars for repairs, which won't help my chances for the raise I had expected."—"All right, John. Do all you can to keep things going. I'll get my clothes on and come right up, then we will telegraph for repair parts, etc. Good-bye."

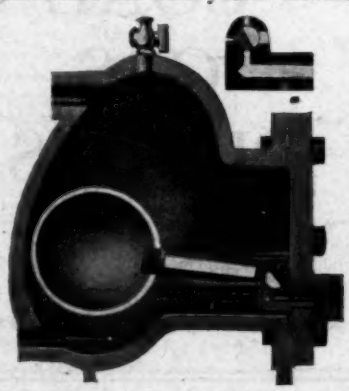
Note: The above is neither a bad dream nor an advertising scheme but actually happened. Could it happen in your works?

A Guaranteed Trap

After fourteen years of testing under a variety of conditions, a steam trap using a Corliss type of valve has been successfully marketed by the Plant Engineering & Equipment Company of New York City. This device, known as The Corliss Valve Steam Trap, is unique in its construction and is said to possess so many advantages over the ordinary types of traps, that it is being rapidly adopted by the largest plants in the country, where economy and highest efficiency are sought.

This trap is complete in six parts and requires no packing or gaskets. The valve, due to its oscillating action, never draws away from its seat; consequently no trouble is experienced with scale, grit, mud and other foreign matter depositing on the valve seat.

This oscillating or semi-rotary action is not affected by the velocity of discharged condensate, opening and closing with perfect ease due to the buoyancy and weight of large float with ample leverage, whereas the ordinary plug and socket type valve is slammed shut in the same manner which the velocity of water slams the stopper in your bath tub outlet; by removing the effects of velocity there is produced a trap of far greater capacity and absolutely guaranteed for two years' service.



THE CORLISS VALVE STEAM TRAP

Positive action is assured by the manner in which the float is attached to both sides of the valve, the centre of which is the fulcrum. Each trap is carefully tested before shipment and no adjustment is required.

The simplicity of the operation can be judged from the accompanying illustration. The valve always is sealed, as the condensation never entirely leaves the trap. This has a two-fold advantage—(1), steam cannot possibly escape, and—(2), any mud, scale or foreign matter collected in the bottom of the trap is not disturbed at each discharge, while base at collection chamber is tapped for blowers.

An outstanding feature of the Corliss Valve Steam Trap is its low maintenance cost. It is claimed that on the thousands of traps that have been working for years, repairs are practically unknown. Every trap is numbered serially and covered by a stringless two year *service* guarantee, thereby thoroughly protecting every purchaser. Besides operating on steam systems this trap is meeting with marked success in the removal of water from compressed air systems, as an automatic drip on high pressure gas mains, on ammonia stills, gasoline extraction units, etc.

The six parts of which the Corliss Valve Steam Trap is composed include a cast iron housing, valve seat, float arm, float and cover. Into a recess counterbored into the chamber is fitted a cover which has a ground joint, eliminating the use of soft rubber packing. The valve mechanism is screwed to the inside of the cover and friction is minimized through having but one moving part, and the easy sliding action of a rotary valve.

The Dripless Baffle Separator

Wherever there is steam there is condensation, and separators should be used to reduce the velocity and get out the water in suspension, the Dripless Baffle Separator being of approved design with ample area to reduce velocity and chamber capacity to catch the biggest slug of water.

Advice on condensation removal problems and details concerning the Corliss Valve Steam Trap or the Penco Thermo Gauge will be gladly furnished by the Plant Engineering and Equipment Company, Inc., 6 Church Street, New York City.

ESTABLISHED 1855

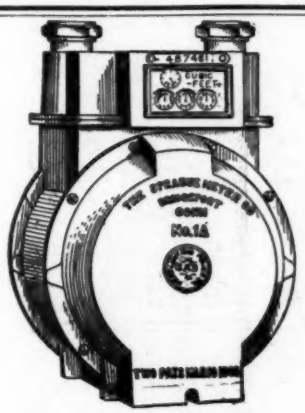
McDONALD METERS

NOTED FOR ACCURACY

Consumers' Meters, Regular and Prepayment. Station Meter Work of Every Description. Meters Repaired. Meter Provers. Correspondence Solicited.

D. McDONALD & CO.

ALBANY, N. Y.



Dependable Accuracy
Lessens Maintenance

With **Sprague Meters** it saves 65 per cent of the upkeep costs. Figure it on the years' installations —then write for proof.

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